

Cumulative Subject Index for 2000¹ Volumes 142–147

A

- Absorption EPR
signals, first-harmonic out-of-phase, spin relaxation measurements using rotational motion effects, Livshits and Marsh, **145**, 84
- Acceleration
correlations with position and velocity in fluid transport, 2D PFG NMR for, Han, Stapf, and Blümich, **146**, 169
- Accordion excitation
²J,³J-HMBC, Krishnamurthy *et al.*, **146**, 232
- AC electric field
strong, molecules aligned by, dipolar interactions in, Peshkovsky and McDermott, **147**, 104
- Acetylcholinesterase
Torpedo californica, inhibitors interacting with, ¹H NMR relaxation study, Delfini *et al.*, **144**, 129
- Achilles tendon
anisotropy in, *in vivo* analysis by portable NMR scanner NMR-MOUSE, Haken and Blümich, **144**, 195
tensile loading, changes in apparent diffusion coefficient caused by, Han *et al.*, **144**, 217
- Acquisition (*see also* Data acquisition)
 ω -space adaptive acquisition technique for MRI from projections, Placidi, Alecci, and Sotgiu, **143**, 197
- Acquisition weighting
three-dimensional ¹³C CSI of isolated infarcted rat heart, Weidensteiner *et al.*, **143**, 17
- Active-coupling-pattern-tilting spectroscopy
heteronuclear, sensitivity improvement and acquisition scheme, Koźmiński and Nanz, **142**, 294
- Adaptive filtering
nonlinear, identification of NMR spin systems by, Asfour, Raouf, and Fournier, **145**, 37
- Adiabatic decoupling
synchronized, Zhang and Gorenstein, **147**, 110
- Adiabatic decoupling sidebands
analytical solution for amplitudes and phases as function of spin inversion time τ , Zhang and Gorenstein, **144**, 316
- Adiabatic pulses
dephasing, REDOR with, Heise, Leppert, and Ramachandran, **146**, 181
- Adjusted chemical-shift phase encoding
fast variant of ¹H spectroscopic U-FLARE using, Ebel, Dreher, and Leibfritz, **142**, 241
- Air
solid, molecular oxygen in, multifrequency EPR spectra, Pardi *et al.*, **146**, 375
- ²⁷Al
andalusite and 9Al₂O₃ · 2B₂O₃, population and coherence transfer induced by double-frequency sweeps in half-integer quadrupolar spin systems, Iuga *et al.*, **147**, 192
inorganic phosphate multispin systems, measurement of dipole–dipole interactions using compensated REDOR, Chan and Eckert, **147**, 170
multiple-quantum cross polarization with 2D MQMAS NMR, Ashbrook and Wimperis, **147**, 238
- Alanine
¹³C–²D dipolar couplings, measuring with universal REDOR dephasing curve, Gullion, **146**, 220
¹³CH₃ group in CH₃–CH segment, multiple-quantum J-resolved NMR spectroscopy, Liu and Zhang, **146**, 277
- L-Alanine
¹³C–¹⁴N heteronuclear distances, MAS NMR determination without irradiation of second spin: RIDER, Saalwächter and Schmidt-Rohr, **145**, 161
¹³C, ¹⁵N-labeled, carbon-proton dipolar decoupling in REDOR, Mehta *et al.*, **145**, 156
deuterium–carbon REDOR NMR spectroscopy, Sack and Vega, **145**, 52
- AlcR–DNA complex
¹⁵N exchange NMR for unambiguous assignment of ¹H^N/¹⁵N resonances, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
- Algorithms
for calculation of cross polarization spectra influenced by slow molecular tumbling, Mayer, **145**, 216
time-domain, for NMR spectral normalization, Romano, Santini, and Indovina, **146**, 89
for torus factor: relationship between RF field and radial position in toroid cavity probes, Woelk, **146**, 157
- AMARES
frequency-selective quantitation of biomedical MRS data, Vanhamme *et al.*, **143**, 1
- Amide exchange
hydrogen–deuterium, in complex membrane proteins, NMR-based measurements, Czernski, Vinogradova, and Sanders, **142**, 111
- Amino acids
evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletas, and Balaban, **143**, 79
¹H–¹⁵N TROSY experiments, suppression of spurious peaks, Kojima and Kainosho, **143**, 417
side chains, of α -spectrin SH3 domain, identification of signal patterns in 2D RFDR spectra, Pauli *et al.*, **143**, 411
- γ -Aminobutyric acid
and taurine, simultaneous spectral editing using double quantum coherence transfer, Lei and Peeling, **143**, 95
- AMX systems
multipolar, NMR relaxation under spin-locking conditions, Kaikkonen and Kowalewski, **146**, 297
- Analytical continuation
in spectral estimation of NMR relaxation, Naugler and Cushley, **145**, 209
- Analytical transfer functions
for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280
- Angles
between tensorial interactions, cross-correlated relaxation for measurement of, Reif *et al.*, **143**, 45
- Anisotropic diffusion
in nematic liquid crystal, electric field PFG NMR approach, Holstein *et al.*, **143**, 427
- Anisotropic rotational diffusion
effects, separation from exchange contributions to transverse relaxation rates, Renner and Holak, **145**, 192

¹ Boldface numbers indicate volume; lightface numbers indicate pagination.

- Anisotropic self-diffusion
in salt water ice, NMR characterization, Menzel *et al.*, **143**, 376
- Anisotropy
changes in apparent diffusion coefficient caused by tensile loading of rabbit Achilles tendon, Han *et al.*, **144**, 217
and exchange broadening, separation using ^{15}N CSA– ^{15}N – ^1H dipole–dipole relaxation cross-correlation, Renner and Holak, **145**, 192
rotational diffusion, detection and quantification from NMR relaxation data, Bayesian statistical method, Andrec *et al.*, **146**, 66
in tendon, *in vivo* analysis by portable NMR scanner NMR-MOUSE, Haken and Blümich, **144**, 195
- Announcements
The Laukien Prize, **146**, 248
Parameters and Symbols for Use in Nuclear Magnetic Resonance, **145**, 160
- Apparent diffusion coefficient
changes caused by tensile loading of rabbit Achilles tendon, Han *et al.*, **144**, 217
- Approximation
small tip-angle: *k*-space analysis of MR tagging, Kerwin and Prince, **142**, 313
Voigt function, analytical derivation of, Bruce *et al.*, **142**, 57
- $\text{ArCH}_2\text{-X}$
 $\text{X}=\text{Br,H}$, flexible molecules dissolved in liquid-crystalline phases, automatic analysis of NMR spectra, Castiglione *et al.*, **142**, 216
- Arginine repressor
 ^{13}C -labeled N-terminal domain, DNA complex with, time-shared $\text{X}(\omega_1)$ -half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168
- Aromatic amino acid residues
 ^{13}C , ^{15}N -labeled, proteins, measurement of $^3J_{\text{N,C}\gamma}$ and $^3J_{\text{C}'\text{,C}\gamma}$ coupling constants, Löhr and Rüterjans, **146**, 126
- Artifacts
inhomogeneity-induced, reducing in functional MRI of human brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
magnetization transfer, suppression using concatenated inversion in TILT, Pruessmann *et al.*, **146**, 58
motion, in diffusion imaging, reduction using navigator echoes and velocity compensation, Clark, Barker, and Tofts, **142**, 358
relaxation-induced, compensation for: clean TROSY, Schulte-Herbrüggen and Sørensen, **144**, 123
rotation, in burst imaging, Wheeler-Kingshott, Crémillieux, and Doran, **143**, 161
- Atomic refinement
using orientational restraints from solid-state NMR, Bertram *et al.*, **147**, 9
- Atomic structure
in prediction of NMR relaxation of globular proteins, computer program HYDRONMR, García de la Torre, Huertas, and Carrasco, **147**, 138
- Automatic analysis
NMR spectra of flexible molecules dissolved in liquid-crystalline phases, Castiglione *et al.*, **142**, 216
- Automatic correction
phase and frequency shifts and lineshape distortions across series of single resonance lines, in large spectral data sets, Witjes *et al.*, **144**, 35
- Automatic frequency control
electronically tunable surface-coil-type resonator for L-band EPR, Hirata, Walczak, and Swartz, **142**, 159
- Automatic matching control
electronically tunable surface-coil-type resonator for L-band EPR, Hirata, Walczak, and Swartz, **142**, 159
- B
- Backbone
protein, ^{15}N relaxation rates, as tool for diagnosis of structure quality, de Alba and Tjandra, **144**, 367
- Backbone angle ψ
in proteins, determination with TROSY-based α/β -HN(CO)CA-J, Permi, Kilpeläinen, and Annala, **146**, 255
- Backbone dynamics
rotational diffusion anisotropy, detection and quantification from NMR relaxation data, Bayesian statistical method, Andrec *et al.*, **146**, 66
- Bacteria
colonies, diffusion-weighted imaging in STRAFI plane, Carlton, Halse, and Strange, **143**, 24
- Barbituric acid
evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
- Bayesian statistical method
detection and quantification of rotational diffusion anisotropy from NMR relaxation data, Andrec *et al.*, **146**, 66
- 2,1,3-Benzoselenadiazole
 ^{77}Se spectra in, analysis: spin-1/2 nucleus scalar coupled to quadrupolar nuclei, Bernatowicz *et al.*, **145**, 152
- Berry's phase
simultaneous soft pulses applied at nearby frequencies, Steffen, Vendersypen, and Chuang, **146**, 369
- βTC3 cells
bioartificial pancreas containing, total choline levels in, *in vitro* monitoring: ^1H NMR studies of effects of oxygen level, Long *et al.*, **146**, 49
- B_1 gradients
nutration spin echo and use for localized NMR, Ardelean, Kimmich, and Klemm, **146**, 43
- Bicelles
magnetically oriented, pegylation, King, Parker, and Howard, **142**, 177
rubredoxin in, orientational ambiguities in structure from dipolar couplings, variation of molecular alignment for resolving, Al-Hashimi *et al.*, **143**, 402
- Binary signal detection
detection of nuclear resonance signals, improvement using feedback control, Blauch, Schiano, and Ginsberg, **144**, 305
- Biological media
dynamics of spins 3/2 in, model for, Hancu, van der Maarel, and Boada, **147**, 179
- Biological objects
time-domain RF EPR imaging, parallel coil resonators for, Devasahayam *et al.*, **142**, 168
- Biomedical data
MRS signals, frequency-selective quantitation of, Vanhamme *et al.*, **143**, 1
- Bipolar gradient pulses
and monopolar gradient pulses, cross-relaxation effects in stimulated-echo-type PGSE NMR by, Dvinskikh and Furó, **146**, 283
- Bipolar magnetic field gradients
improved convection compensating PFGSE and stimulated-echo methods for use with, Sørland *et al.*, **142**, 323
- Biradicals
nitroxide, dead-time-free measurements of dipole–dipole interactions between electron spins, Pannier *et al.*, **142**, 331
- Bituminous coal
macerals separated from, thermally excited multiplet states in, Więckowski *et al.*, **145**, 62
- Blends
polymer, WIM/WISE NMR studies of chain dynamics in, Qiu and Mirau, **142**, 183
- Bloch equations
accurate intensities of broad NMR lines from composite pulse experiments, Hedin and Furó, **142**, 32
in high-gradient magnetic resonance force microscopy, Dougherty *et al.*, **143**, 106
with magnetization exchange: effects of off-resonance irradiation, cross

- relaxation, and chemical exchange on steady-state magnetization and effective T_1 times, Kingsley and Monahan, **143**, 360
- nonlinear phase adjustment of selective excitation pulses, Carlson, **147**, 210
- Bloch–Siegert shift
- simultaneous soft pulses applied at nearby frequencies, Steffen, Vendersypen, and Chuang, **146**, 369
- ⁸¹Br
- broad NMR lines from composite pulse experiments, accurate intensities of, Hedin and Furó, **142**, 32
- Brain
- activation, fMRI, reducing inhomogeneity artifacts (human), Merboldt, Finsterbusch, and Frahm, **145**, 184
- fMRI: gradient-echo line scan imaging using 2D-selective RF excitation, Finsterbusch and Frahm, **147**, 17
- ¹H spectroscopic U-FLARE imaging, fast variant using adjusted chemical shift phase encoding (rat), Ebel, Dreher, and Leibfritz, **142**, 241
- in vivo* ¹³C MRS at 1.5 T, peak assignments (human), Blüml *et al.*, **143**, 292
- T_2 , rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- Brent algorithm
- torus factor: relationship between RF field and radial position in toroid cavity probes, Woelk, **146**, 157
- Broadband decoupling
- improved sequence for liquid crystals and solids, Fung, Khitrin, and Ermolaev, **142**, 97
- Broadband echo sequence
- using π composite pulse, for pure NQR of spin $I = \frac{3}{2}$ powder sample, Odín, **143**, 299
- Broadband high-field EMR spectroscopy
- ultrawide band multifrequency, Hassan *et al.*, **142**, 300
- Broad NMR lines
- from composite pulse experiments, accurate intensities of, Hedin and Furó, **142**, 32
- Burst imaging
- rotation artifacts in, Wheeler-Kingshott, Crémillieux, and Doran, **143**, 161
- C
- ¹²C
- proton detection of carbon–carbon spin coupling constants in symmetrical molecules, Berger, **142**, 136
- ¹³C
- ¹³C–¹³C RFDR spectra of α -spectrin SH3 domain: sample optimization and identification of signal patterns of amino acid side chains, Pauli *et al.*, **143**, 411
- ¹³C–²D dipolar couplings in alanine, measuring with universal REDOR dephasing curve, Gullion, **146**, 220
- [¹³C₂]glycine, rotational resonance NMR of spinning single crystal, coherence transfer signals in, Antzutkin and Levitt, **147**, 147
- chemical-shift resolution, imaging of ¹H NMR second moment imaging with, Nonaka, Matsui, and Inouye, **145**, 315
- ¹³CH₃ group in CH₃–CH segment of alanine, multiple-quantum J -resolved NMR spectroscopy, Liu and Zhang, **146**, 277
- ¹³C- and ²H-isotopically labeled saccharides, ²H T_1 and quadrupolar coupling constants in, Bose-Basu *et al.*, **144**, 207
- ¹³C-labeled proteins
- DNA complex, time-shared X(ω)-half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168
- HCACO, sensitivity enhancement using HMQC magnetization transfer scheme, Xia *et al.*, **143**, 407
- methyl-containing side chains, 3D HCCH₃-TOCSY for resonance assignment of, Uhrin *et al.*, **142**, 288
- ¹³C MRS of human brain at 1.5 T *in vivo*, peak assignments, Blüml *et al.*, **143**, 292
- ¹³C–¹⁴N and ¹³C–²H heteronuclear distances in L-alanine and *d*₃-methylmalonic acid, MAS NMR determination without irradiation of second spin: RIDER, Saalwächter and Schmidt-Rohr, **145**, 161
- ¹³C, ¹⁵N-labeled L-alanine, carbon-proton dipolar decoupling in REDOR, Mehta *et al.*, **145**, 156
- ¹³C, ¹⁵N-labeled proteins
- glycine, measurement of internuclear distances in solid-state NMR by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26
- hydrophobic peptide in oriented membranes, REDOR NMR on, Middleton *et al.*, **147**, 366
- ³J_{N,C γ} and ³J_{C',C γ} coupling constants of aromatic residues, measurement, Lóhr and Rüterjans, **146**, 126
- RAP 18–112, 3D protein NMR TROSY-type HCCH correlation experiments, diagonal peak suppression in, Meissner and Sørensen, **144**, 171
- ¹³C, ¹⁵N-labeled RNA oligonucleotides, sensitivity-enhanced MQ–HCN–CCH–TOCSY and MQ–HCN–CCH–COSY pulse schemes for, Hu, Jiang, and Gosser, **145**, 147
- ¹³C and ¹⁵N NMR spectral density maps, peptide internal motions on nanosecond time scale derived from direct fitting of, Mayo *et al.*, **146**, 188
- ¹³C–¹⁵N spin systems of glycine, recoupling of heteronuclear dipolar interactions with rotational-echo double-resonance at high MAS frequencies, Jaroniec *et al.*, **146**, 132
- coal, detection of anisotropic hyperfine transitions in zero magnetic field using field-cycling techniques, Sturm *et al.*, **142**, 139
- CP/MAS experiments in solids, modified spectral editing methods for, Hu *et al.*, **142**, 326
- dimethyl sulfone: simulations of chemical exchange lineshapes in CP/MAS spectra using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33
- doubly ¹³C-labeled hydroxybutyric acid, spinning-frequency-dependent narrowband RF-driven dipolar recoupling, Goobes, Boender, and Vega, **146**, 204
- efficient deuterium–carbon REDOR NMR spectroscopy, Sack and Vega, **145**, 52
- high-resolution ¹³C 3D CSA-CSA-CSA correlation experiment based on magic angle turning, Hu *et al.*, **145**, 230
- MAS double-quantum filtered dipolar shift correlation spectroscopy, Heindrichs, Geen, and Titman, **147**, 68
- MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, initial conditions for, Tekely *et al.*, **145**, 173
- PGSE NMR experiment with heteronuclear dipolar decoupling, diffusion measurements in liquid crystals and solids, Dvinskikh, Sitnikov, and Furó, **142**, 102
- poly(*n*-butylmethacrylate), application of MAS exchange method using sideband separation: PATROS, Reichert *et al.*, **146**, 311
- pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- relaxation data, determination of global τ_R of proteins using, Mispelner *et al.*, **143**, 229
- sequence for obtaining ¹³CH + ¹³CH₂-only ¹³C spectra: spectral editing improvement, Burns, Wu, and Zilm, **143**, 352
- spin–lattice relaxation times, characterization of molecular motion in solid state by, Varner, Vold, and Hoatson, **142**, 229
- spin systems, double-quantum filtration under rotational-resonance conditions, Dusold and Sebald, **145**, 340
- three-dimensional chemical-shift imaging in isolated infarcted rat heart, Weidensteiner *et al.*, **143**, 17
- ¹³C $^\alpha$
- ubiquitin backbone angle ψ , determination with TROSY-based α/β -HN(CO)CA- J experiment, Permi, Kilpeläinen, and Annala, **146**, 255
- Carbon coupling
- proton detection of carbon–carbon spin coupling constants in symmetrical molecules, Berger, **142**, 136

- Cardiac valves
MRI in living mouse, Ruff *et al.*, **146**, 290
- Carr–Purcell–Meiboom–Gill
orientation-dependent ^{19}F dipolar couplings within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
pulse sequence, relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
spin dynamics of CPMG-like sequences in grossly inhomogeneous B_0 and B_1 fields and application to NMR well logging, Hürlimann and Griffin, **143**, 120
- Carr–Purcell pulse sequence
behavior of echo train: NMR in inhomogeneous magnetic fields, Bălibanu *et al.*, **145**, 246
- Cartilage
dynamics of spins 3/2 in, model for, Hancu, van der Maarel, and Boada, **147**, 179
sodium visibility and quantitation using high-field ^{23}Na MRI and MRS, Shapiro *et al.*, **142**, 24
- CARVE
based volume selective detection by weighted averaging of constant tip angle scans, Serša and Macura, **143**, 208
- Catalysts
monolithic, thermally polarized ^1H NMR microimaging of liquid and gas flow in, Koptyug *et al.*, **147**, 36
- Cell alignment
erythrocytes in magnetic field of NMR spectrometer, evidence based on diffusion tensor of water, Kuchel *et al.*, **145**, 291
- Cellular research
integrated confocal and magnetic resonance microscope for, Wind *et al.*, **147**, 371
- Cesium perfluorooctanoate
liquid crystalline, diffusion in, ^{13}C PGSE NMR with heteronuclear dipolar decoupling, Dvinskikh, Sitnikov, and Furó, **142**, 102
- Chain dynamics
in solid polymers and blends, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
- Chain motions
pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- $\text{CH}_3\text{CD}_2\text{I}$
tunneling spectroscopy from magnetization evolution in tilted rotating frame of nuclear spins, Damyanovich, Peternelj, and Pintar, **145**, 1
- Chemical exchange
effect on steady-state magnetization and effective T_1 relaxation times, Kingsley and Monahan, **143**, 360
multiple-site saturation transfer kinetic measurements, correcting for incomplete saturation and off-resonance effects, Kingsley and Monahan, **146**, 100
one-pulse experiment with, measurement of T_1 and concentrations, Spencer and Fishbein, **142**, 120
proton, dependent saturation transfer, class of MRI contrast agents based on, Ward, Aletras, and Balaban, **143**, 79
and relaxation, in NMR simulations, Cuperlovic *et al.*, **142**, 11
separation of anisotropy and exchange broadening using ^{15}N CSA– ^{15}N – ^1H dipole–dipole relaxation cross-correlation, Renner and Holak, **145**, 192
simulations in CP/MAS spectra using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33
- Chemical shielding tensor
 ^{15}N and ^1H , in nucleic acid base pairs, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142
- Chemical-shift anisotropy
high-resolution ^{13}C 3D CSA-CSA-CSA correlation experiment by means of magic angle turning, Hu *et al.*, **145**, 230
iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
 ^{15}N , tensor magnitude and orientation in molecular frame of uracil, MAS NMR, Leppert, Heise, and Ramachandran, **145**, 307
separation of anisotropy and exchange broadening using ^{15}N CSA– ^{15}N – ^1H dipole–dipole relaxation cross-correlation, Renner and Holak, **145**, 192
spin $\frac{1}{2}$ ensemble experiencing, REDOR with adiabatic dephasing pulses, Heise, Leppert, and Ramachandran, **146**, 181
- Chemical-shift imaging
with continuously flowing hyperpolarized xenon, for characterization of materials, Moudrakovski *et al.*, **144**, 372
three-dimensional ^{13}C , in isolated infarcted rat heart, Weidensteiner *et al.*, **143**, 17
- Chemical shifts
L-aspartic acid and 4,9-dioxo-1,12-dodecanediamine, concurrent with simultaneous 3D electrophoretic NMR COSY spectra, He *et al.*, **147**, 361
 ^{13}C , resolution, imaging of ^1H NMR second moment imaging with, Nonaka, Matsui, and Inouye, **145**, 315
temperature-dependent, ^{23}Na in $\text{Na}_4\text{HTm}[\text{DOTP}]$, Shapiro *et al.*, **143**, 213
- Chemical shift tensors
 ^{15}N , magnitude and orientation in molecular frame of uracil via MAS NMR, Leppert, Heise, and Ramachandran, **145**, 307
- Chemometrics
relationships between ^1H NMR relaxation data and technological parameters of meat, Brown *et al.*, **147**, 89
- χ_1 -angle
related $^3J_{\text{N,C}\gamma}$ and $^3J_{\text{C,C}\gamma}$ couplings of aromatic residues in ^{13}C , ^{15}N -labeled proteins, measurement, Löhr and Rüterjans, **146**, 126
- Chloromethylbenzenes
ortho and *meta*, and other benzenes, codissolved in nematic liquid crystals, spectral, orientational order, and structural parameters, Syvitski and Burnell, **144**, 58
- Choline
total levels in bioartificial pancreas, *in vitro* monitoring: ^1H NMR studies of effects of oxygen level, Long *et al.*, **146**, 49
- Circular sample
radial and longitudinal effect in double TE_{104} and single TE_{102} rectangular cavity, Mazúr, Valko, and Morris, **142**, 37
- ^{35}Cl
 Cu^{2+} -doped L-histidine, $^{14}\text{N}/^{35}\text{Cl}$ – $^{14}\text{N}/^{35}\text{Cl}$ and ^1H – $^{14}\text{N}/^{35}\text{Cl}$ spectra, 2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
- Classical momentum problem
in stable reconstruction of T_2 distribution, Steinbrecher *et al.*, **146**, 321
- Closed circuit system
continuous-flow optical pumping NMR in, Kneller *et al.*, **147**, 261
- ^{59}Co
tetrahedral cluster $\text{HFeCo}_3(\text{CO})_{11}\text{PPh}_2\text{H}$, 2D COSY for $S=7/2$ spins, Kempgens *et al.*, **142**, 64
- Coal
bituminous, macerals separated from, thermally excited multiplet states in, Więckowski *et al.*, **145**, 62
- Coherence pathway selection
and thermal convection currents in NMR, Jerschow, **145**, 125
- Coherence transfer
conversion of triple- to single-quantum coherences in MQMAS NMR, Pruski, Wiench, and Amoureux, **147**, 286
double-quantum
simultaneous spectral editing for γ -aminobutyric acid and taurine using, Lei and Peeling, **143**, 95
spectral editing with, off-resonance effects of RF pulses used in, Lei and Peeling, **144**, 89
induced by double-frequency sweeps in half-integer quadrupolar spin systems, Iuga *et al.*, **147**, 192

- sensitivity gain by simultaneous acquisition of two coherence pathways:
HNCA⁺ experiment, Salzmann *et al.*, **143**, 223
- signals, in rotational resonance NMR of spinning single crystal, Antzutkin and Levitt, **147**, 147
- Coherence transfer functions
analytical, for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280
- Coherent cross polarization
theory, for spin- $\frac{1}{2}$ coupled to general object, Magusin and Veeman, **143**, 243
- Coils
small, in variable-temperature single-crystal NMR, Vosegaard *et al.*, **142**, 379
- Collaboratory
development and use of virtual NMR facility, Keating *et al.*, **143**, 172
- Compensation
eddy current, in high-resolution diffusion imaging using radial turbo spin-echo sequence, Seifert *et al.*, **144**, 243
gradient, versus thin sections, for reducing inhomogeneity artifacts in fMRI of brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
strategy, in REDOR NMR measurement of dipole-dipole interactions in multispin inorganic phosphate systems, Chan and Eckert, **147**, 170
velocity, and navigator echoes, reduction of motion artifacts in diffusion imaging using, Clark, Barker, and Tofts, **142**, 358
- Complexes
proteins in, in slow chemical exchange with free form, ¹⁵N exchange NMR for unambiguous assignment of ¹H^N/¹⁵N resonances, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
- Composite pulses
accurate intensities of broad NMR lines from experiments using, Hedini and Furó, **142**, 32
measuring ¹³C-²D dipolar couplings with universal REDOR dephasing curve, Gullion, **146**, 220
 π , broadband echo sequence using, for pure NQR of spin $I = \frac{3}{2}$ powder sample, Odin, **143**, 299
- Computer simulation
NMR experiments involving pulsed-field gradients: Virtual NMR Spectrometer, Nicholas *et al.*, **145**, 262
SIMPSON, general program for solid-state NMR spectroscopy, Bak, Rasmussen, and Nielsen, **147**, 296
- Concrete
turbo spin-echo single-point imaging, Beyea *et al.*, **144**, 255
- Condition number
as measure of noise performance of diffusion tensor data acquisition schemes with MRI, Skare *et al.*, **147**, 340
- Confinement
relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
- Confocal scanning fluorescent microscopy
integrated with magnetic resonance microscopy, for cellular research, Wind *et al.*, **147**, 371
- Conformation
disaccharide, modified GOESY in analysis of, Dixon, Widmalm, and Bull, **147**, 266
- Constant time experiments
avoiding cross-correlated relaxation rate measurement errors, Carlomagno and Griesinger, **144**, 280
- Constant time variable delay
STAR operator incorporation in ²J,³J-HMBC, Krishnamurthy *et al.*, **146**, 232
- Constant tip angle excitation
weighted averaging of signals acquired with, volume selective detection by, Serša and Macura, **143**, 208
- Continuous flow
hyperpolarized xenon produced in, chemical-shift imaging with, for characterization of materials, Moudrakovski *et al.*, **144**, 372
optical pumping, in closed circuit system, Kneller *et al.*, **147**, 261
- Continuous wavelet transform
time-domain quantification of multiple-quantum-filtered ²³Na signal using, Serrai *et al.*, **142**, 341
- Contrast
dipolar, for dense tissues imaging, Grenier, Pascui, and Briguet, **147**, 353
- Contrast agents
MRI, new class based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
- Contrast enhancement
in MRI: numerical studies of intermolecular multiple-quantum coherences, Garrett-Roe and Warren, **146**, 1
- Convection
thermal convection currents in NMR, Jerschow, **145**, 125
- Convection compensating methods
improved, PFGSE and stimulated-echo, Sørland *et al.*, **142**, 323
- Conversion
triple- to single-quantum coherences in MQMAS NMR, Pruski, Wiench, and Amoureux, **147**, 286
- Coronary angiography
MRI of coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290
- Correlation of motion
2D PFG NMR for encoding correlations of position, velocity, and acceleration in fluid transport, Han, Stapf, and Blümich, **146**, 169
- Correlation spectroscopy
MAS double-quantum filtered dipolar shift correlation spectroscopy, Heindrichs, Geen, and Titman, **147**, 68
three-dimensional electrophoretic NMR correlation spectroscopy, He *et al.*, **147**, 361
three-dimensional protein NMR TROSY-type HCCH correlation experiments, diagonal peak suppression in, Meissner and Sørensen, **144**, 171
two-dimensional, for $S=7/2$ spins, theory and application: ⁵⁹Co in tetrahedral cluster HFeCo₃(CO)₁₁PPh₂H, Kempgens *et al.*, **142**, 64
two-dimensional ENDOR-ESEEM, Bar *et al.*, **145**, 115
- Correlation time imaging
application to granular flow system, Caprihan and Seymour, **144**, 96
- Coupling constants (*see J coupling*)
- Couplings
one-bond, measurement in proteins with short transverse relaxation times, Kontaxis, Clore, and Bax, **143**, 184
- CP/MAS (*see Cross polarization-magic-angle spinning*)
- Cramér-Rao bound expressions
for parametric estimation of overlapping peaks: influence of prior knowledge, Cavassila *et al.*, **143**, 311
- Cross-correlated relaxation
for measurement of angles between tensorial interactions, Reif *et al.*, **143**, 45
rates, avoiding measurement errors, Carlomagno and Griesinger, **144**, 280
- Cross correlation
effects, evaluation in proteins with short transverse relaxation times, Kontaxis, Clore, and Bax, **143**, 184
in longitudinal relaxation of strongly coupled spins, Dorai and Kumar, **145**, 8
¹⁵N CSA-¹⁵N-¹H dipole-dipole relaxation, separation of anisotropy and exchange broadening using, Renner and Holak, **145**, 192
- Cross-correlation rates
longitudinal NMR, iterative fitting procedure for determination of, Wang, Kurochkin, and Zuiderweg, **144**, 175
- Crossed-loop EPR resonator
L-band, Rinard, Quine, and Eaton, **144**, 85

- Cross peaks
in HYSORE spectra of $S = 1/2$, $I = 1/2$ spin systems, Dikanov, Tyryshkin, and Bowman, **144**, 228
- Cross polarization
coherent, for spin- $\frac{1}{2}$ coupled to general object, Magusin and Veeman, **143**, 243
multiple-quantum
in quadrupolar spin systems during magic-angle spinning, Rovnyak, Baldus, and Griffin, **142**, 145
with 2D MQMAS NMR, of quadrupolar nuclei, Ashbrook and Wimperis, **147**, 238
polarization transfer in lipid membranes, Warschawski and Devaux, **145**, 367
spectra, influenced by slow molecular tumbling, calculation of, Mayer, **145**, 216
- Cross polarization dynamics
improvement of spectral editing in solids: sequence for obtaining $^{13}\text{CH} + ^{13}\text{CH}_2$ -only ^{13}C spectra, Burns, Wu, and Zilm, **143**, 352
- Cross polarization–magic-angle spinning
chemical exchange lineshapes in spectra, simulations using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33
 ^{13}C NMR
coherence transfer signals in rotational resonance NMR of spinning single crystal, Antzutkin and Levitt, **147**, 147
experiments in solids, modified spectral editing methods for, Hu *et al.*, **142**, 326
improvement of spectral editing in solids: sequence for obtaining $^{13}\text{CH} + ^{13}\text{CH}_2$ -only ^{13}C spectra, Burns, Wu, and Zilm, **143**, 352
multiple-quantum CP in quadrupolar spin systems, Rovnyak, Baldus, and Griffin, **142**, 145
- Cross-relaxation effects
on steady-state magnetization and effective T_1 relaxation times, Kingsley and Monahan, **143**, 360
in stimulated-echo-type PGSE NMR experiments, by bipolar and monopolar gradient pulses, Dvinskikh and Furó, **146**, 283
- Cross-relaxation rate
quantitative interpretation of magnetization transfer in spoiled gradient echo MRI sequences, Sled and Pike, **145**, 24
- Crystals
small, in variable-temperature single-crystal NMR, Vosegaard *et al.*, **142**, 379
- C_3 symmetry
NMR spin echoes for molecular rotators with, Sullivan and Kisvarsanyi, **145**, 18
- CT-HMQC-HA
semi-constant-time HMQC for measurement of $^3J_{\text{H}^{\text{NH}\alpha}}$ couplings in ^{15}N -labeled proteins, Aitio and Permi, **143**, 391
- Current noise
sources in conductor, 3D physical model of MRI noise based on, Hennessy, **147**, 153
- Cytochrome *c*
oxidized, protein hydration and location of water molecules, ^1H NMR (horse heart), Bertini *et al.*, **147**, 1
- D
- Data acquisition (*see also* Acquisition)
ESEEM measurements with time-resolved detection of entire ESE signal shape, Astashkin, Kozlyuk, and Raitsimring, **145**, 357
- Data acquisition schemes
in diffusion tensor imaging with MRI, condition number as measure of noise performance of, Skare *et al.*, **147**, 340
heteronuclear active-coupling-pattern-tilting spectroscopy, Koźmiński and Nanz, **142**, 294
- Data processing
advanced NMR, in MATLAB: NMRLAB, Günther, Ludwig, and Rüterjans, **145**, 201
- Data spacing
in uniform penalty inversion of multiexponential decay data, Borgia, Brown, and Fantazzini, **147**, 273
- DCOSY
analytical polarization and coherence transfer functions for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280
- Dead time
measurements of dipole–dipole interactions between electron spins free of, Pannier *et al.*, **142**, 331
zero dead time detection of electron spin echo envelope modulation: refocused primary echo, Astashkin and Raitsimring, **143**, 280
- DEAR
multidimensional, measurements in solid-state NMR, Sachleben, Beverwyk, and Frydman, **144**, 330
- Decoupling
adiabatic, sidebands: analytical solution for amplitudes and phases as function of spin inversion time τ , Zhang and Gorenstein, **144**, 316
broadband, improved sequence for liquid crystals and solids, Fung, Khitryn, and Ermolaev, **142**, 97
dipolar
carbon-proton, in REDOR, Mehta *et al.*, **145**, 156
homonuclear, PGSE NMR with, Dvinskikh and Furó, **144**, 142
heteronuclear dipolar, ^{13}C PGSE NMR experiment with, diffusion measurements in liquid crystals and solids, Dvinskikh, Sitnikov, and Furó, **142**, 102
 ^{17}O -decoupled ^1H spectroscopy and imaging with surface coil: STEAM decoupling, Charagundla *et al.*, **143**, 39
synchronized adiabatic, Zhang and Gorenstein, **147**, 110
- Decoupling sidebands
cancellation: synchronized adiabatic decoupling, Zhang and Gorenstein, **147**, 110
- DEER
four-pulse, dead-time-free measurements of dipole–dipole interactions between electron spins, Pannier *et al.*, **142**, 331
- Dehydrotestosterone
in-phase selective excitation of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389
- Delphic torsion potential
Gaussian implementation, protein NMR structures, Kuszewski and Clore, **146**, 249
- Demagnetizing field
two-pulse nutation echoes generated by gradients of RF amplitude and main magnetic field, Ardelean, Scharfenecker, and Kimmich, **144**, 45
- Dense tissues imaging
dipolar contrast for, Grenier, Pascui, and Briguet, **147**, 353
- Dephasing
adiabatic pulse, REDOR with, Heise, Leppert, and Ramachandran, **146**, 181
universal REDOR dephasing curve, measurement of ^{13}C – ^2D dipolar couplings with, Gullion, **146**, 220
- Deuteration
selective, in measurement of proton–proton coupling constants in DNA sugar ring, Yang *et al.*, **146**, 260
- Deuterium–carbon REDOR NMR spectroscopy
with phase-modulated pulses for deuterium recoupling, Sack and Vega, **145**, 52
universal REDOR dephasing curve, measurement of ^{13}C – ^2D dipolar couplings with, Gullion, **146**, 220
- Deuterium NMR
method for setting magic angle for solid-state NMR studies, Nagaraja and Ramanathan, **146**, 165

- Diacylglycerol kinase
hydrogen–deuterium amide exchange, NMR-based measurements, Czernski, Vinogradova, and Sanders, **142**, 111
- Diagnostics
in uniform penalty inversion of multiexponential decay data, Borgia, Brown, and Fantazzini, **147**, 273
- Diagonal peak suppression
3D protein NMR TROSY-type HCCH correlation experiments, Meissner and Sørensen, **144**, 171
3D protein NMR TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}$ – $^1\text{H}^{\text{N}}$ NOESY spectra with, Meissner and Sørensen, **142**, 195
- Diagonal-ridge suppression
pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- Diamagnetic proteins
and protein gels, decay of dipolar order in, Danek and Bryant, **143**, 35
- Dichlorobenzenes
ortho and *meta*, and other benzenes, codissolved in nematic liquid crystals, spectral, orientational order, and structural parameters, Syvitski and Burnell, **144**, 58
- Dielectric resonator
side-access probe based on, for muscle fiber EPR study, Sienkiewicz *et al.*, **143**, 144
whispering gallery, high-field multifrequency EPR spectroscopy using, Anino *et al.*, **143**, 88
- Diffusion
anisotropic, in nematic liquid crystal, electric field PFG NMR approach, Holstein *et al.*, **143**, 427
anisotropic rotational, effects, separation from exchange contributions to transverse relaxation rates, Renner and Holak, **145**, 192
anisotropic self-, in salt water ice, NMR characterization, Menzel *et al.*, **143**, 376
and determining pore sizes using internal magnetic field, Song, **143**, 397
finite-difference approach for high-precision analysis of rotating-frame diffusion images, Woelk *et al.*, **145**, 276
measurements
in liquid crystals and solids, ^{13}C PGSE NMR with heteronuclear dipolar decoupling, Dvinskikh, Sitnikov, and Furó, **142**, 102
at long observation times in presence of spatially variable internal magnetic field gradients, Seland *et al.*, **146**, 14
using nonlinear stimulated echo, Ardelean and Kimmich, **143**, 101
restricted
measurements using oscillating gradient spin-echo sequence, Schachter *et al.*, **147**, 232
relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
water, evidence of red cell alignment in magnetic field of spectrometer, Kuchel *et al.*, **145**, 291
- Diffusion coefficient imaging
application to granular flow system, Caprihan and Seymour, **144**, 96
- Diffusion imaging
high-resolution, using radial turbo spin-echo sequence, Seifert *et al.*, **144**, 243
motion artifacts in, reduction using navigator echoes and velocity compensation, Clark, Barker, and Tofts, **142**, 358
- Diffusion tensor imaging
MRI, data acquisition schemes in, condition number as measure of noise performance of, Skare *et al.*, **147**, 340
- Diffusion-weighted imaging
bacterial colonies in STRAFI plane, Carlton, Halse, and Strange, **143**, 24
- 5,6-Dihydrouracil
evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
- Dimethylbenzenes
ortho and *meta*, and other benzenes, codissolved in nematic liquid crystals, spectral, orientational order, and structural parameters, Syvitski and Burnell, **144**, 58
- Dimethyl sulfone
 ^{13}C : simulations of chemical exchange lineshapes in CP/MAS spectra using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33
–isotactic poly(1-butene) mixture, pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- Diphenylpicrylhydrazyl
high-gradient magnetic resonance force microscopy, Bloch equations in, Dougherty *et al.*, **143**, 106
- Dipolar contrast
for dense tissues imaging, Grenier, Pascui, and Briguet, **147**, 353
- Dipolar coupling
analytical polarization and coherence transfer functions for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280
 ^{13}C – ^2D , measuring with universal REDOR dephasing curve, Gullion, **146**, 220
MAS NMR method for heteronuclear distances without irradiation of second spin: relaxation-induced dipolar exchange with recoupling, Saalwächter and Schmidt-Rohr, **145**, 161
multidimensional dipolar exchange-assisted recoupling measurements in solid-state NMR, Sachleben, Beverwyk, and Frydman, **144**, 330
in multispin systems: compensated REDOR NMR applied to inorganic phosphates, Chan and Eckert, **147**, 170
orientation-dependent ^{19}F , within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
proton–proton, direct refinement against, in NMR structure determination of macromolecules, Tjandra, Marquardt, and Clore, **142**, 393
residual
magnetization transfer via, application to proton–proton correlations in partially aligned proteins, Pellicchia *et al.*, **143**, 435
measurement: orientation of membrane protein in micelles for solution NMR by specific binding of lanthanide ions to added EF-hand, Ma and Opella, **146**, 381
resolution of orientational ambiguities in protein structures from, variation of molecular alignment as means of, Al-Hashimi *et al.*, **143**, 402
- Dipolar coupling spectroscopy (*see* DCOSY)
- Dipolar field effects
suppression in high-resolution liquid NMR, MAS as tool for, Broekaert *et al.*, **145**, 259
- Dipolar interactions
homonuclear, magnetization transfer by, compound RFDR pulse sequences under MAS for, Fujiwara, Khandelwal, and Akutsu, **145**, 73
in molecules aligned by strong AC electric fields, Peshkovsky and McDermott, **147**, 104
NMR spin echoes for molecular rotators with C_3 symmetry, Sullivan and Kisvarsanyi, **145**, 18
role in relaxation of ^{129}Xe in water, Dimitrov, Reddy, and Leigh, **145**, 302
- Dipolar recoupling
narrowband RF-driven, spinning-frequency-dependent, Goobes, Boender, and Vega, **146**, 204
- Dipolar relaxation
decay of dipolar order in diamagnetic and paramagnetic proteins and protein gels, Danek and Bryant, **143**, 35
- Dipolar shift correlation NMR
MAS double-quantum filtered dipolar shift correlation spectroscopy, Heindrichs, Geen, and Titman, **147**, 68
- Dipolar vector correlation
NH–NH, in peptides by solid-state NMR, Reif *et al.*, **145**, 132
- Dipole–dipole interactions
between electron spins, dead-time-free measurements, Pannier *et al.*, **142**, 331

- heteronuclear: compensated REDOR NMR applied to inorganic phosphates, Chan and Eckert, **147**, 170
- Dipole–dipole relaxation
intermolecular, of ^{129}Xe dissolved in water, Dimitrov, Reddy, and Leigh, **145**, 302
- Direct-injection NMR
automated, sample analysis with, small-volume flow probe for, Haner, Llanos, and Mueller, **143**, 69
- Disaccharide
conformation, modified GOESY in analysis of, Dixon, Widmalm, and Bull, **147**, 266
- Distance measurements
internuclear, measurement in solid-state NMR by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26
spinning-frequency-dependent narrowband RF-driven dipolar recoupling, Goobes, Boender, and Vega, **146**, 204
between unlike spins, without irradiation of second spin, MAS method: relaxation-induced dipolar exchange with recoupling, Saalwächter and Schmidt-Rohr, **145**, 161
- Distortion
and toroid cavity detectors for high-resolution NMR and rotating-frame imaging, Momot *et al.*, **142**, 348
- DNA
–protein complex, time-shared $X(\omega_i)$ -half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168
sugar ring, proton–proton coupling constants in, measurement, Yang *et al.*, **146**, 260
- Double-cross polarization REDOR
measurement of internuclear distances in solid-state NMR, Vogt *et al.*, **147**, 26
- Double electron–electron resonance (*see* DEER)
- Double-frequency sweeps
in half-integer quadrupolar spin systems, population and coherence transfer induced by, Iuga *et al.*, **147**, 192
- Double-irradiation method
separation of quadrupolar and magnetic contributions to spin-lattice relaxation in case of single isotope, Suter *et al.*, **143**, 266
- Double-quantum coherence
efficient double-quantum excitation in rotational resonance NMR, Karlsson *et al.*, **145**, 95
intermolecular, numerical studies: NMR and MRI, Garrett-Roe and Warren, **146**, 1
- Double-quantum coherence transfer
simultaneous spectral editing for γ -aminobutyric acid and taurine using, Lei and Peeling, **143**, 95
spectral editing with, off-resonance effects of RF pulses used in, Lei and Peeling, **144**, 89
- Double-quantum filter
simultaneous spectral editing for γ -aminobutyric acid and taurine using DQ coherence transfer, Lei and Peeling, **143**, 95
- Double-quantum filtered COSY (*see* DQF-COSY)
- Double-quantum filtering
under rotational-resonance conditions, Dusold and Sebald, **145**, 340
separation of ortho and para NMR signals in solid deuterium, Malmi *et al.*, **145**, 326
- Double resonance
 ^1H – ^{17}O NQR double-resonance study of hydrogen disorder in 2-nitrobenzoic acid, Torkar, Žagar, and Seliger, **144**, 13
- DQF-COSY
determining phase cycles of minimum length: MakeCycle, Ollerenshaw and McClung, **143**, 255
MAS double-quantum filtered dipolar shift correlation spectroscopy, Heindrichs, Geen, and Titman, **147**, 68
- Dynamic nuclear polarization
 ^1H , in supercritical ethylene at 1.4 T, Wind *et al.*, **143**, 233
high-frequency, in nuclear rotating frame, Farrar *et al.*, **144**, 134
- Dynamics (*see also* Molecular dynamics; Spin dynamics)
backbone, rotational diffusion anisotropy, detection and quantification from NMR relaxation data, Bayesian statistical method, Andreć *et al.*, **146**, 66
chain, in solid polymers and blends, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
protein, measurements, TROSY-based NMR, Zhu *et al.*, **143**, 423
segmental, pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
side chain of radical anions of ubiquinones, ENDOR spectroscopic and molecular orbital study, Lehtovuori and Joela, **145**, 319
spins $3/2$ in biological media, model, Hancu, van der Maarel, and Boada, **147**, 179
- E
- Echo-detected EPR
pulsed EPR spin-probe study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364
- Echoes
mixed: NMR in inhomogeneous magnetic fields, Bälibanu *et al.*, **145**, 246
multiple: two-pulse nutation echoes generated by gradients of RF amplitude and main magnetic field, Ardelean, Scharfenecker, and Kimmich, **144**, 45
navigator, velocity compensation with, reduction of motion artifacts in diffusion imaging using, Clark, Barker, and Tofts, **142**, 358
refocused primary: zero dead time detection of electron spin echo envelope modulation, Astashkin and Raitsimring, **143**, 280
- Echo-planar imaging
rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- E.COSY
and ^3H J coupling between C^α and H^{N} across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 431
measurement of $\text{C}'\text{N}$ and $\text{C}'\text{H}^{\text{N}}$ J -coupling constants across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 387
- Eddy current compensation
in high-resolution diffusion imaging using radial turbo spin-echo sequence, Seifert *et al.*, **144**, 243
- Eddy current magnetic field
suppression, improved convection compensating PFGSE and stimulated-echo methods for, Sørland *et al.*, **142**, 323
- Efficiency of conversion
triple- to single-quantum coherences in MQMAS NMR, Pruski, Wiench, and Amoureux, **147**, 286
- EF-hand
added, specific binding of lanthanide ions to, and orientation of membrane protein in micelles for solution NMR, Ma and Opella, **146**, 381
- Elastomers
one-dimensional imaging with palm-size probe, Prado, Blümich, and Schmitz, **144**, 200
- Electric fields
molecular motion in polar organic solvent induced by, MRI, Riley and Augustine, **144**, 288
PFG NMR measurement of anisotropic diffusion in nematic liquid crystal, Holstein *et al.*, **143**, 427
strong AC, molecules aligned by, dipolar interactions in, Peshkovsky and McDermott, **147**, 104
- Electroconvection
in polar organic solvent, magnetic resonance imaging, Riley and Augustine, **144**, 288
- Electronic notebook
development and use of virtual NMR facility, Keating *et al.*, **143**, 172

- Electron nuclear quadruple resonance
for assignment of overlapping spectra, Bowman and Tyryshkin, **144**, 74
- Electron paramagnetic resonance (*see* EPR)
- Electron spin echo
entire signal shape, ESEEM measurements with time-resolved detection of, Astashkin, Kozlyuk, and Raitsimring, **145**, 357
multiphoton resonances in pulsed EPR, Gromov and Schweiger, **146**, 110
- Electron spin echo envelope modulation (*see* ESEEM)
- Electron spin resonance (*see* EPR)
- Electron spins
dipole–dipole interactions between, dead-time-free measurements of, Pannier *et al.*, **142**, 331
- Electrophoretic NMR
three-dimensional electrophoretic NMR COSY, He *et al.*, **147**, 361
- ENDOR
electron nuclear quadruple resonance method based on, for assignment of overlapping spectra, Bowman and Tyryshkin, **144**, 74
spectroscopic and molecular orbital study of dynamics of side chain of radical anions of ubiquinones, Lehtovuori and Joela, **145**, 319
two-dimensional ENDOR-ESEEM correlation spectroscopy, Bar *et al.*, **145**, 115
two-dimensional pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
- ENDOR-induced EPR
dynamics of side chain of radical anions of ubiquinones, Lehtovuori and Joela, **145**, 319
- EPI
rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- EPR (*see also* Pulsed EPR)
absorption, first-harmonic out-of-phase signals, spin relaxation measurements using, rotational motion effects, Livshits and Marsh, **145**, 84
analysis of thermally excited multiplet states in macerals separated from bituminous coal, Więckowski *et al.*, **145**, 62
Bloch equations in high-gradient magnetic resonance force microscopy, Dougherty *et al.*, **143**, 106
dead-time-free measurements of dipole–dipole interactions between electron spins, Pannier *et al.*, **142**, 331
echo-detected, pulsed EPR spin-probe study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364
ENDOR-induced, and dynamics of side chain of radical anions of ubiquinones, Lehtovuori and Joela, **145**, 319
field-cycling, detection of anisotropic hyperfine transitions in zero magnetic field, Sturm *et al.*, **142**, 139
high-field, spin-labeled lipids in membranes, simulation studies, Livshits and Marsh, **147**, 59
high-field multifrequency
molecular oxygen in solid air, Pardi *et al.*, **146**, 375
using whispering gallery dielectric resonators, Annino *et al.*, **143**, 88
high-field pulsed, 2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
identification of joining fragments of antique marbles, Attanasio and Platania, **144**, 322
in vivo
L-band, electronically tunable surface-coil-type resonator for, Hirata, Walczak, and Swartz, **142**, 159
time-domain RF EPR imaging of biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168
lines arising from species with different transition moments, approach to separating, Hofbauer and Bittl, **147**, 226
MAS, instrumentation, performance, and limitations, Hessinger *et al.*, **147**, 217
method for quantitation of spin concentration, application to methemoglobin and metmyoglobin, Svistunenko *et al.*, **142**, 266
quantitative, radial and longitudinal effect in double TE₁₀₄ and single TE₁₀₂ rectangular cavity, Mazúr, Valko, and Morris, **142**, 37
quasi-optical, Jones matrix formalism for, Budil *et al.*, **144**, 20
spectral simulation of nitroxides, characterization of biological membranes, Štrancar, Šentjurc, and Schara, **142**, 254
- EPR imaging
radiofrequency time-domain, biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168
using magnetic-field-gradient spinning, Ohno and Watanabe, **143**, 274
- EPR resonator
dielectric resonator-based side-access, for muscle fiber EPR, Sienkiewicz *et al.*, **143**, 144
L-band crossed-loop, Rinard, Quine, and Eaton, **144**, 85
- Ernst model
and one-pulse experiment with chemical exchange, Spencer and Fishbein, **142**, 120
- Error estimation
Cramér-Rao bound expressions for parametric estimation of overlapping peaks, Cavassila *et al.*, **143**, 311
- Errors
Gaussian error propagation in spectral estimation of NMR relaxation, Nau-gler and Cushley, **145**, 209
in measurement of cross-correlated relaxation rate, and avoidance of, Car-lomagno and Griesinger, **144**, 280
systematic data errors in uniform penalty inversion of multiexponential decay data, Borgia, Brown, and Fantazzini, **147**, 273
- Erythrocytes
alignment in magnetic field of NMR spectrometer, evidence based on diffusion tensor of water, Kuchel *et al.*, **145**, 291
- ESEEM
measurements with time-resolved detection of entire ESE signal shape, Astashkin, Kozlyuk, and Raitsimring, **145**, 357
two-dimensional ENDOR-ESEEM correlation spectroscopy, Bar *et al.*, **145**, 115
zero dead time detection: refocused primary echo, Astashkin and Raitsim-ring, **143**, 280
- ESR (*see* EPR)
- Ethylene
supercritical, ¹H dynamic nuclear polarization at 1.4 T, Wind *et al.*, **143**, 233
- Ethylmalonic acid
deuterium–carbon REDOR NMR spectroscopy, Sack and Vega, **145**, 52
- Exchange NMR
¹⁵N, for unambiguous assignment of ¹H/¹⁵N resonances of proteins in complexes in slow chemical exchange with free form, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- Exchange spectroscopy
correlations of position, velocity, and acceleration in fluid transport, 2D PFG NMR for, Han, Stapf, and Blümich, **146**, 169
- Excitation (*see also* Selective excitation)
constant tip angle, weighted averaging of signals acquired with, volume selective detection by, Serša and Macura, **143**, 208
RF, signal loss during, in TQ-filtered sodium MRI: model for dynamics of spins 3/2 in biological media, Hancu, van der Maarel, and Boada, **147**, 179
2D-selective RF, gradient-echo line scan imaging using, Finsterbusch and Frahm, **147**, 17
- Excitation bandwidth
broadband echo sequence using π composite pulse for pure NQR of spin $I = \frac{3}{2}$ powder sample, Odin, **143**, 299
- Excitation sculpting
extension to selective excitation, Roumestand and Canet, **147**, 331
in-phase selective excitation of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389

Explosives detection

- using nuclear quadrupole resonance: modification of receiver operating characteristics using feedback, Blauch, Schiano, and Ginsberg, **144**, 305

F

¹⁹F

- ¹³C- $\{^{19}\text{F}\}$ PGSE NMR diffusion measurements in liquid crystals and solids, Dvinskikh, Sitnikov, and Furó, **142**, 102
- H₂¹⁸O solvent-induced isotope shift in ¹⁹F NMR, Arnold and Fisher, **142**, 1
- lyotropic liquid crystal
 - cross-relaxation effects in stimulated-echo-type PGSE NMR, Dvinskikh and Furó, **146**, 283
 - PGSE NMR with homonuclear dipolar decoupling, Dvinskikh and Furó, **144**, 142
- orientation-dependent dipolar couplings, within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81

Fast imaging

- rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116

Feedback control

- modification of receiver operating characteristics: detection of nuclear resonance signals, Blauch, Schiano, and Ginsberg, **144**, 305

Ferrocene

- molecular motion in solid state, characterization by ¹³C spin-lattice relaxation times, Varner, Vold, and Hoatson, **142**, 229

Field-cycling EPR

- detection of anisotropic hyperfine transitions in zero magnetic field, Sturm *et al.*, **142**, 139

Field profiling

- and heteronuclear method, calibration of stray field gradient by, Preston, Kinchesh, and Randall, **146**, 359

Filter

- double-cross polarization, with REDOR, measurement of internuclear distances in solid-state NMR using, Vogt *et al.*, **147**, 26
- double-quantum, simultaneous spectral editing for γ -aminobutyric acid and taurine using DQ coherence transfer, Lei and Peeling, **143**, 95
- FIR, in frequency-selective quantitation of biomedical MRS data, Vanhamme *et al.*, **143**, 1
- single-quantum coherence, for strongly coupled spin systems for localized ¹H NMR spectroscopy, Trabesinger, Mueller, and Boesiger, **145**, 237
- spin-state-selective, protein backbone angle ψ determination with TROSY-based α/β -HN(CO)CA-*J* experiment, Permi, Kilpeläinen, and Annala, **146**, 255
- time-shared X(ω_1)-half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168

Filter diagonalization method

- multidimensional
 - application to 2D projections of 2D, 3D, and 4D NMR experiments, Hu *et al.*, **144**, 357
 - theory and numerical implementation, Mandelshtam, **144**, 343
- two-dimensional, regularization: FDM2K, Chen, Mandelshtam, and Shaka, **146**, 363

Filtered back-projection

- comparison of 3D pulsed ESR Fourier imaging with, Feintuch *et al.*, **142**, 382

Filtering

- double-quantum
 - under rotational-resonance conditions, Dusold and Sebald, **145**, 340
 - separation of ortho and para NMR signals in solid deuterium, Malmi *et al.*, **145**, 326
- double-quantum filtered COSY (*see* DQF-COSY)
- ²³Na multiple-quantum-filtered NMR, time-domain quantification using continuous wavelet transform analysis, Serrai *et al.*, **142**, 341

- nonlinear adaptive, identification of NMR spin systems by, Asfour, Raoof, and Fournier, **145**, 37

Finite-difference approach

- for high-precision analysis of rotating-frame diffusion images, Woelk *et al.*, **145**, 276

Finite pulse effects

- and recoupling of heteronuclear dipolar interactions with rotational-echo double-resonance at high MAS frequencies, Jaroniec *et al.*, **146**, 132

FIR filter

- in frequency-selective quantitation of biomedical MRS data, Vanhamme *et al.*, **143**, 1

FLASH

- 3D, in MRI of coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290

Flavodoxin

- ¹³C, ¹⁵N-labeled, ³J_{NC γ} and ³J_{C γ C γ} coupling constants of aromatic residues, measurement, Löhrr and Rüterjans, **146**, 126

Flexible molecules

- dissolved in liquid-crystalline phases, automatic analysis of NMR spectra, Castiglione *et al.*, **142**, 216

Floquet theory

- multiphoton resonances in pulsed EPR, Gromov and Schweiger, **146**, 110
- and sparse matrix methods, simulations of chemical exchange lineshapes in CP/MAS spectra using, Hazendonk *et al.*, **146**, 33

Flow

- granular, application of correlation time and diffusion coefficient imaging, Caprihan and Seymour, **144**, 96
- liquid and gas, in monolithic catalysts, thermally polarized ¹H NMR micro-imaging, Koptyug *et al.*, **147**, 36
- thermal convection currents in NMR, Jerschow, **145**, 125

Flow probe

- small-volume, for automated direct-injection NMR analysis, Haner, Llanos, and Mueller, **143**, 69

Flufenamic acid

- orientation-dependent ¹⁹F dipolar couplings within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81

Fluid transport

- 2D PFG NMR for encoding correlations of position, velocity, and acceleration in, Han, Stapf, and Blümich, **146**, 169

Fluorine compounds

- ¹⁹F NMR, H₂¹⁸O solvent-induced isotope shift in, Arnold and Fisher, **142**, 1

fMRI (*see* Magnetic resonance imaging, fMRI)*N*-Formyl-L-Met-L-Leu-L-Phe

- NH-NH vector correlation by solid-state NMR, Reif *et al.*, **145**, 132

Fourier imaging

- three-dimensional pulsed ESR using, Feintuch *et al.*, **142**, 382

Fourier transform NMR spectra

- improved baseline recognition and modeling, Golotvin and Williams, **146**, 122

Fragment assembly

- ESR identification of joining fragments of antique marbles, Attanasio and Platania, **144**, 322

Frequency-selective quantitation

- biomedical MRS data, Vanhamme *et al.*, **143**, 1

Frequency shifts

- in large spectral data sets, automatic correction, Witjes *et al.*, **144**, 35

Functional MRI (*see* Magnetic resonance imaging, fMRI)

G

Gabor transform

- water peak suppression using, comparison with wavelet approach, Antoine, Coron, and Dereppe, **144**, 189

Gas

flow in monolithic catalysts, thermally polarized ^1H NMR microimaging, Koptyug *et al.*, **147**, 36

Gaussian Delphic potentials

refinement of protein NMR structures against torsion angle potentials of mean force, Kuszewski and Clore, **146**, 249

Gaussian error propagation

in spectral estimation of NMR relaxation, Naugler and Cushley, **145**, 209

Gelation factor

segment 4, separation of anisotropy and exchange broadening using ^{15}N CSA- ^{15}N - ^1H dipole-dipole relaxation cross-correlation experiments, Renner and Holak, **145**, 192

General object

spin- $\frac{1}{2}$ coupled to, coherent cross polarization theory for, Magusin and Veeman, **143**, 243

Geometry

ligand-protein complexes, determination, molecular symmetry as aid in, Al-Hashimi, Bolon, and Prestegard, **142**, 153

GHMBC

determining phase cycles of minimum length: MakeCycle, Ollerenshaw and McClung, **143**, 255

Glasses

intracellular, in seed and pollen, pulsed EPR study, Buitink *et al.*, **142**, 364

Glassy solvents

high-spin Fe(III) complexes in, electron spin-lattice relaxation rates at temperatures between 6 and 298 K, Zhou *et al.*, **144**, 115

Globular proteins

NMR relaxation, prediction from atomic-level structures and hydrodynamic calculations: HYDRONMR, García de la Torre, Huertas, and Carrasco, **147**, 138

Glucose infusion

peak assignments of *in vivo* ^{13}C MRS at 1.5 T after, Blüml *et al.*, **143**, 292

Glycine

$^{13}\text{C}_2$ glycine, rotational resonance NMR of spinning single crystal, coherence transfer signals in, Antzutkin and Levitt, **147**, 147

^{13}C , ^{15}N -labeled, measurement of internuclear distances in solid-state NMR by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26

^{13}C - ^{15}N spin systems, recoupling of heteronuclear dipolar interactions with rotational-echo double-resonance at high MAS frequencies, Jaroniec *et al.*, **146**, 132

GOESY

modified, in analysis of disaccharide conformation, Dixon, Widmalm, and Bull, **147**, 266

Gradient calibration

stray field, by heteronuclear method and field profiling, Preston, Kinches, and Randall, **146**, 359

Gradient compensation

vs thin sections, for reducing inhomogeneity artifacts in fMRI of brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184

Gradient-echo line scan imaging

using 2D-selective RF excitation, Finsterbusch and Frahm, **147**, 17

Gradient-echo sequences

2D and 3D, in MRI of coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290

Gradient-enhanced heteronuclear correlation (see GHMBC)

Gradient pulses

bipolar and monopolar, cross-relaxation effects in stimulated-echo-type PGSE NMR experiments by, Dvinskikh and Furó, **146**, 283

Gramicidin S

in-phase selective excitation of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389

Granular flows

application of correlation time and diffusion coefficient imaging, Caprihan and Seymour, **144**, 96

H

 ^1H

carbon-proton dipolar decoupling in REDOR, Mehta *et al.*, **145**, 156

Cu^{2+} -doped L-histidine, ^1H - ^1H and ^1H - $^{14}\text{N}/^{35}\text{Cl}$ spectra, 2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196

shielding tensors in nucleic acid base pairs, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142

 ^2H

^{13}C - ^2H heteronuclear distances in d_3 -methylmalonic acid, MAS NMR determination without irradiation of second spin: RIDER, Saalwächter and Schmidt-Rohr, **145**, 161

efficient deuterium-carbon REDOR NMR spectroscopy, Sack and Vega, **145**, 52

powder NMR lineshapes, dip in, Westlund, **145**, 364

solid, ortho and para NMR signals, separation via DQ filtering, Malmi *et al.*, **145**, 326

spin-lattice relaxation, and quadrupolar coupling constants, in isotopically labeled saccharides, Bose-Basu *et al.*, **144**, 207

T_{1z} and T_{1Q} anisotropies, and ^{13}C MAS T_{1z} , characterization of molecular motion in solid state by, Varner, Vold, and Hoatson, **142**, 229

Hartmann-Hahn transfer

analytical polarization and coherence transfer functions for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280

broadband HEHAHA sequences with short cycle times, Luy and Glaser, **142**, 369

HCACO

sensitivity enhancement using HMQC magnetization transfer scheme, Xia *et al.*, **143**, 407

HCCH correlation

three-dimensional protein NMR TROSY-type, diagonal peak suppression in, Meissner and Sørensen, **144**, 171

HCCH₃-TOCSY

3D, for resonance assignment of methyl-containing side chains in ^{13}C -labeled proteins, Uhrin *et al.*, **142**, 288

HCN-CCH-COSY

sensitivity-enhanced MQ, pulse schemes for ^{13}C , ^{15}N -labeled RNA oligonucleotides, Hu, Jiang, and Gosser, **145**, 147

HCN-CCH-TOCSY

sensitivity-enhanced MQ, pulse schemes for ^{13}C , ^{15}N -labeled RNA oligonucleotides, Hu, Jiang, and Gosser, **145**, 147

Heart

coronary arteries and heart valves, MRI in living mouse, Ruff *et al.*, **146**, 290

isolated infarcted, 3D ^{13}C -spectroscopic imaging (rat), Weidensteiner *et al.*, **143**, 17

HEHAHA

broadband, sequences with short cycle times, Luy and Glaser, **142**, 369

Helical wheels

membrane protein, imaging, Wang *et al.*, **144**, 162

solid-state NMR index of helical membrane protein structure and topology, Marassi and Opella, **144**, 150

Heme proteins

protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, ^1H NMR study, Bertini *et al.*, **147**, 1

Heme species

quantitation in methemoglobin and metmyoglobin by EPR method, Svis-tunenko *et al.*, **142**, 266

Heterocyclic ring chemicals

evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79

Heterogeneous materials

diffusion measurements at long observation times in presence of spatially variable internal magnetic field gradients, Seland *et al.*, **146**, 14

turbo spin-echo single-point imaging, Beyea *et al.*, **144**, 255

- Heteronuclear active-coupling-pattern-tilting spectroscopy
sensitivity improvement and acquisition scheme, Koźmiński and Nanz, **142**, 294
- Heteronuclear correlation
single-quantum (*see* HSQC)
- Heteronuclear dipolar coupling
sideband patterns from rotor-encoded longitudinal magnetization in MAS recoupling experiments, De Paul *et al.*, **146**, 140
- Heteronuclear dipolar decoupling
¹³C PGSE NMR experiment with, diffusion measurements in liquid crystals and solids, Dvinskikh, Sitnikov, and Furó, **142**, 102
- Heteronuclear dipolar recoupling
with rotational-echo double-resonance at high MAS frequencies, Jaroniec *et al.*, **146**, 132
- Heteronuclear dipole–dipole interaction
compensated REDOR NMR applied to inorganic phosphates, Chan and Eckert, **147**, 170
- Heteronuclear experiment
and field profiling, calibration of stray field gradient by, Preston, Kinches, and Randall, **146**, 359
- Heteronuclear local field NMR spectroscopy
under fast MAS conditions, McElheny, De Vita, and Frydman, **143**, 321
- Heteronuclear three-dimensional NMR
¹⁵N exchange, for unambiguous assignment of ¹H^N/¹⁵N resonances of proteins in complexes in slow chemical exchange with free form, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
- HFeCo₃(CO)₁₁PPh₂H
tetrahedral cluster, ⁵⁹Co in, application of 2D COSY for *S*=7/2 spins, Kempgens *et al.*, **142**, 64
- High-field EPR
multifrequency EPR spectra of molecular oxygen in solid air, Pardi *et al.*, **146**, 375
spin-labeled lipids in membranes, simulation studies, Livshits and Marsh, **147**, 59
- High-field pulsed EPR
2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
- High gradient
magnetic resonance force microscopy, Bloch equations in, Dougherty *et al.*, **143**, 106
- High magnetic field
multifrequency EPR spectroscopy, using whispering gallery dielectric resonators, Annino *et al.*, **143**, 88
- High-resolution diffusion imaging
using radial turbo spin-echo sequence, Seifert *et al.*, **144**, 243
- High-resolution liquid NMR
MAS as tool for suppressing dipolar field effects, Broecker *et al.*, **145**, 259
- High-resolution NMR
in inhomogeneous fields: numerical studies of intermolecular multiple-quantum coherences, Garrett-Roe and Warren, **146**, 1
partially oriented *ortho* and *meta* benzenes codissolved in nematic liquid crystal, Syvitski and Burnell, **144**, 58
and rotating-frame imaging, toroid cavity detectors for, Momot *et al.*, **142**, 348
- High-resolution solid-state NMR
MAS EPR: instrumentation, performance, and limitations, Hessinger *et al.*, **147**, 217
sample restriction using magnetic field gradients, Charmont *et al.*, **145**, 334
- High RF power
NMR probe, for low-temperature studies, Damyanovich, Peternejl, and Pintar, **144**, 1
- High-spin systems
generalization of slow-motion theory of nuclear spin relaxation in paramagnetic low-symmetry complexes to, Nilsson and Kowalewski, **146**, 345
- High-throughput screening
small-volume flow probe for automated direct-injection NMR analysis, Haner, Llanos, and Mueller, **143**, 69
- Hippocampus
activation, test of method for reducing inhomogeneity artifacts in fMRI of brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
- L-Histidine
Cu²⁺-doped, 2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
- HMBC
²J, ³J-HMBC: long-range heteronuclear shift correlation technique, Krishnamurthy *et al.*, **146**, 232
- HMQC
J-multiplied, for measuring ³J<sub>HNH_α coupling constants, Xia *et al.*, **146**, 228
magnetization transfer scheme, sensitivity enhancement of HCACO using, Xia *et al.*, **143**, 407</sub>
- HNCA⁺ experiment
sensitivity gain by simultaneous acquisition of two coherence pathways, Salzmann *et al.*, **143**, 223
- α/β-HN(CO)CA-*J*
TROSY-based experiment, determination of backbone angle *ψ* in proteins, Permi, Kilpeläinen, and Annala, **146**, 255
- Homomultimer
α-methyl mannose bound to mannose-binding protein complex, geometry determination using symmetry, Al-Hashimi, Bolon, and Prestegard, **142**, 153
- Homonuclear dipolar decoupling
PGSE NMR with, Dvinskikh and Furó, **144**, 142
- Homonuclear dipolar interaction
under MAS conditions, magnetization transfer by, compound RFDR pulse sequences for, Fujiwara, Khandelwal, and Akutsu, **145**, 73
orientation-dependent ¹⁹F dipolar couplings within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
- HSQC
application of multidimensional filter diagonalization method, Hu *et al.*, **144**, 357
HSQC-HECADE sequence, sensitivity improvement and acquisition scheme of heteronuclear ACT spectroscopy, Koźmiński and Nanz, **142**, 294
semi-constant-time HMSQC for measurement of ³J_{HNH_α couplings in ¹⁵N-labeled proteins, Aitio and Permi, **143**, 391}
- Hydration properties
oxidized horse heart cytochrome *c*, ¹H NMR study, Bertini *et al.*, **147**, 1
- Hydrodynamics
in prediction of NMR relaxation of globular proteins, computer program HYDRONMR, García de la Torre, Huertas, and Carrasco, **147**, 138
- Hydrogen bonding effects
on ¹⁵N and ¹H shielding tensors in nucleic acid base pairs, Czernek, Fiala, and Sklenář, **145**, 142
- Hydrogen bonds
¹H–¹⁷O NQR double-resonance study of hydrogen disorder in 2-nitrobenzoic acid, Torkar, Žagar, and Seliger, **144**, 13
internucleotide ¹J_{HN} couplings, determination by modified 2D *J*_{NN}-correlated [¹⁵N, ¹H] TROSY, Yan *et al.*, **147**, 357
in proteins
³*J* coupling between C^α and H^N across, Meissner and Sørensen, **143**, 431
techniques for measurement of C¹N and C¹H^N *J*-coupling constants across, Meissner and Sørensen, **143**, 387
- Hydrogen–deuterium amide exchange
in complex membrane proteins, NMR-based measurements, Czerski, Vinogradova, and Sanders, **142**, 111
- Hydrogen disorder
in 2-nitrobenzoic acid, ¹H–¹⁷O NQR double-resonance study, Torkar, Žagar, and Seliger, **144**, 13

HYDRONMR

prediction of NMR relaxation of globular proteins from atomic-level structures and hydrodynamic calculations, García de la Torre, Huertas, and Carrasco, **147**, 138

Hydrophobic peptide

in oriented membranes, REDOR NMR on, Middleton *et al.*, **147**, 366

Hydroxybutyric acid

doubly ^{13}C -labeled, spinning-frequency-dependent narrowband RF-driven dipolar recoupling, Goobes, Boender, and Vega, **146**, 204

Hyperfine sublevel correlation spectroscopy (*see* HYSORE spectra)

Hyperfine transitions

anisotropic, detection in zero magnetic field using field-cycling techniques, Sturm *et al.*, **142**, 139

Hyperpolarized ^{129}Xe

continuously flowing, chemical-shift imaging with, for characterization of materials, Moudrakovski *et al.*, **144**, 372

Hypoxia

effect on total choline levels in bioartificial pancreas, ^1H NMR studies, Long *et al.*, **146**, 49

HYSORE spectra

$S = 1/2$, $I = 1/2$ spin systems, intensity of cross-peaks in, Dikanov, Tyryshkin, and Bowman, **144**, 228

I

Ice

salt water, pore structure and anisotropic self-diffusion in, NMR characterization, Menzel *et al.*, **143**, 376

Imaging

burst, rotation artifacts in, Wheeler-Kingshott, Crémillieux, and Doran, **143**, 161

diffusion-weighted, of bacterial colonies in STRAFI plane, Carlton, Halse, and Strange, **143**, 24

gradient-echo line scan, using 2D-selective RF excitation, Finsterbusch and Frahm, **147**, 17

^1H spectroscopic U-FLARE, fast variant using adjusted chemical shift phase encoding, Ebel, Dreher, and Leibfritz, **142**, 241

microscopic displacement, with pulsed-field-gradient turbo spin-echo NMR, Scheenen *et al.*, **142**, 207

^{17}O -decoupled ^1H , with surface coil: STEAM decoupling, Charagundla *et al.*, **143**, 39

rotating-frame, and high-resolution NMR, toroid cavity detectors for, Motot *et al.*, **142**, 348

single-coil surface, using RF field gradient, Baril *et al.*, **146**, 223

spin-lock adiabatic field cycling, low-frequency molecular dynamics studied by, Anorado, Hauser, and Kimmich, **142**, 372

thermally polarized ^1H NMR microimaging of liquid and gas flow in monolithic catalysts, Koptyug *et al.*, **147**, 36

time-domain RF EPR, of biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168

Impedance matching

method for measuring Q value of NMR sample coil based on, Jiang, **142**, 386

Indirect detection

with high-speed MAS, sensitivity enhancement in solid-state ^{15}N NMR by, Ishii and Tycko, **142**, 199

INEPT

determining phase cycles of minimum length: MakeCycle, Ollerenshaw and McClung, **143**, 255

polarization transfer in lipid membranes, Warschawski and Devaux, **145**, 367

Inhomogeneity artifacts

reducing in functional MRI of human brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184

Inhomogeneous fields

grossly inhomogeneous B_0 and B_1 , spin dynamics of CPMG-like sequences in, and application to NMR well logging, Hürlimann and Griffin, **143**, 120

high-resolution NMR: numerical studies of intermolecular multiple-quantum coherences, Garrett-Roe and Warren, **146**, 1

relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95

Inhomogeneous magnetic fields

nuclear magnetic resonance in, Bällibanu *et al.*, **145**, 246

In-phase editing

selective excitation of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389

Insensitive nuclei enhanced by polarization transfer (*see* INEPT)

Integrated microscope

confocal and magnetic resonance, for cellular research, Wind *et al.*, **147**, 371

Intensity

cross-peak, in HYSORE spectra of $S = 1/2$, $I = 1/2$ spin systems, Dikanov, Tyryshkin, and Bowman, **144**, 228

Intermolecular multiple-quantum coherences

numerical studies: NMR and MRI, Garrett-Roe and Warren, **146**, 1

Internal magnetic field

pore size determination using, Song, **143**, 397

Internal magnetic field gradients

spatially variable, diffusion measurements at long observation times in presence of, Seland *et al.*, **146**, 14

Internal motions

peptide, on nanosecond time scale, derived from direct fitting of ^{13}C and ^{15}N NMR spectral density maps, Mayo *et al.*, **146**, 188

Internuclear distance

in solid-state NMR, measurement by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26

Inversion

UPEN: data spacing, T_2 data, systematic data errors, and diagnostics, Borgia, Brown, and Fantazzini, **147**, 273

In vivo EPR

L-band, electronically tunable surface-coil-type resonator for, Hirata, Walczak, and Swartz, **142**, 159

time-domain RF EPR imaging of biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168

In vivo MRI

coronary arteries and heart valves in mouse, Ruff *et al.*, **146**, 290

In vivo NMR

large spectral data sets, automatic correction for phase and frequency shifts and lineshape distortions across series of single resonance lines, Witjes *et al.*, **144**, 35

Iron(III) complexes

high-spin, in glassy solvents at temperatures between 6 and 298 K, electron spin-lattice relaxation rates for, Zhou *et al.*, **144**, 115

Iron porphyrins

high-spin iron(III) complexes in glassy solvents at temperatures between 6 and 298 K, T_1 rates, Zhou *et al.*, **144**, 115

Iron(III) species

paramagnetic effects on nuclear magnetic relaxation of fluid protons in porous media, Bryar, Daughney, and Knight, **142**, 74

Isotope shift

H_2^{18}O solvent-induced, in ^{19}F NMR, Arnold and Fisher, **142**, 1

Isotropic mixing magnetization transfer profiles

in three-spin topologies, analysis and prediction, Sahu, **147**, 121

IS spin system

J -coupled spin evolution during RF irradiation of one spin, vector and quantum representations, Bendall and Skinner, **143**, 329

2J , 3J -HMBC technique differentiating $^2J_{\text{CH}}$ from $^3J_{\text{CH}}$ correlations to protonated carbons, Krishnamurthy *et al.*, **146**, 232

Iterative fitting

procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175

J

J coupling

C¹³N and C¹³H¹N, techniques for measurement across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 387

determination in peptide: application of heteronuclear ACT spectroscopy, Koźmiński and Nanz, **142**, 294

³*J* coupling between C¹³ and H¹ across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 431

^h*J*_{HN}, internucleotide, determination by modified 2D *J*_{NN}-correlated [¹⁵N, ¹H] TROSY, Yan *et al.*, **147**, 357

³*J*_{H¹N¹³C¹³α} couplings in ¹⁵N-labeled proteins, semi-constant-time HMQC for measurement of, Aitio and Permi, **143**, 391

³*J*_{N¹³C¹³γ} and ³*J*_{C¹³C¹³γ} of aromatic residues in ¹³C, ¹⁵N-labeled proteins, measurement, Löhner and Rüterjans, **146**, 126

³*J*, ³*J*-HMBC technique differentiating ²*J*_{CH} from ³*J*_{CH} correlations to protonated carbons, Krishnamurthy *et al.*, **146**, 232

multiple-quantum *J*-resolved NMR spectroscopy: measurement of MQ relaxation rates and relative signs of spin coupling constants, Liu and Zhang, **146**, 277

nuclear quadrupolar, in isotopically labeled saccharides, ²H *T*₁ and, Bose-Basu *et al.*, **144**, 207

proton detection of carbon-carbon spin coupling constants in symmetrical molecules, Berger, **142**, 136

proton-proton, in DNA sugar ring, measurement, Yang *et al.*, **146**, 260

spin evolution in IS spin system during RF irradiation of one spin, vector and quantum representations, Bendall and Skinner, **143**, 329

TROSY-based α/β-HN(CO)CA-*J* experiment, determination of backbone angle ψ in proteins, Permi, Kilpeläinen, and Annala, **146**, 255

J coupling constants

L-aspartic acid and 4,9-dioxo-1,12-dodecanediamine, concurrent with simultaneous 3D electrophoretic NMR COSY spectra, He *et al.*, **147**, 361

³*J*_{H¹N¹³C¹³α}, *J*-multiplied HMQC experiment for measuring, Xia *et al.*, **146**, 228

*J*_{NN}-correlated [¹⁵N, ¹H] TROSY

modified 2D, determination of internucleotide ^h*J*_{HN} couplings by, Yan *et al.*, **147**, 357

²*J*, ³*J*-HMBC

long-range heteronuclear shift correlation technique differentiating ²*J*_{CH} from ³*J*_{CH} correlations, Krishnamurthy *et al.*, **146**, 232

Jones matrix formalism

for quasioptical EPR, Budil *et al.*, **144**, 20

J-resolved Γ experiment

avoiding cross-correlated relaxation rate measurement errors, Carlomagno and Griesinger, **144**, 280

K

k-space analysis

MR tagging, Kerwin and Prince, **142**, 313

L

Lactate

spectral editing with DQ coherence transfer, off-resonance effects of RF pulses used in, Lei and Peeling, **144**, 89

Lanthanide ions

specific binding to added EF-hand and orientation of membrane protein in micelles for solution NMR, Ma and Opella, **146**, 381

Laser-polarized xenon (*see* Hyperpolarized ¹²⁹Xe)

Lead nitrate

thermometer for nonspinning solid-state NMR spectroscopy, Beckmann and Dybowski, **146**, 379

Lead zirconate

²⁰⁷Pb NMR, with multiple-rotor-cycle 2D PASS sequences, Vogt *et al.*, **143**, 153

Leukocytes

membranes, EPR spectral simulation of nitroxides, Štrancar, Šentjerc, and Schara, **142**, 254

Librational motion

pulsed EPR study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364

Ligand-protein complexes

geometry determination, molecular symmetry as aid in, Al-Hashimi, Bolon, and Prestegard, **142**, 153

Line narrowing

spin dynamics of PISEMA in multiple spin systems, Gan, **143**, 136

Line scan imaging

gradient-echo, using 2D-selective RF excitation, Finsterbusch and Frahm, **147**, 17

Lineshape distortions

across series of single resonance lines, in large spectral data sets, automatic correction, Witjes *et al.*, **144**, 35

Lineshapes

chemical exchange, simulations in CP/MAS spectra using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33

cross polarization spectra influenced by slow molecular tumbling, calculation, Mayer, **145**, 216

phase correction independent of: phase angle measurement from peak areas, Džakula, **146**, 20

powder deuterium NMR, dip in, Westlund, **145**, 364

Lipid bilayers

magnetically oriented, pegylation, King, Parker, and Howard, **142**, 177

oriented, uniformly ¹⁵N-labeled helical membrane proteins in, 3D solid-state NMR resolution of resonances of in-plane residues, Marassi *et al.*, **144**, 156

Lipid membranes

polarization transfer in, Warschawski and Devaux, **145**, 367

Lipids

spin-labeled, in membranes, simulation studies of high-field EPR spectra, Livshits and Marsh, **147**, 59

Liposomes

EPR spectral simulation of nitroxides, Štrancar, Šentjerc, and Schara, **142**, 254

Liquid

flow in monolithic catalysts, thermally polarized ¹H NMR microimaging, Koptyug *et al.*, **147**, 36

Liquid-crystalline phases

flexible molecules dissolved in, automatic analysis of NMR spectra, Castiglione *et al.*, **142**, 216

Liquid crystals

diffusion in, ¹³C PGSE NMR with heteronuclear dipolar decoupling, Dvinskikh, Sitnikov, and Furó, **142**, 102

improved broadband decoupling sequence for, Fung, Khitrin, and Ermolaev, **142**, 97

lyotropic, ¹⁹F PGSE NMR

cross-relaxation effects, Dvinskikh and Furó, **146**, 283

with homonuclear dipolar decoupling, Dvinskikh and Furó, **144**, 142

nematic

anisotropic diffusion, electric field PFG NMR, Holstein *et al.*, **143**, 427

partially oriented *ortho* and *meta* benzenes codissolved in, spectral, orientational order, and structural parameters, Syvitski and Burnell, **144**, 58

- Liquid NMR
 high-resolution, MAS as tool for suppressing dipolar field effects, Broekaert *et al.*, **145**, 259
- Localized spectroscopy
 NMR, use of nutation spin echo, Ardelean, Kimmich, and Klemm, **146**, 43
- Longitudinal effect
 and radial effect, in double TE₁₀₄ and single TE₁₀₂ rectangular cavity, Mazúr, Valko, and Morris, **142**, 37
- Longitudinal magnetization
 rotor-encoded, in MAS recoupling experiments, sideband patterns from, De Paul *et al.*, **146**, 140
- Longitudinal multiple-quantum modes
 for quantifying cross correlations in longitudinal relaxation of strongly coupled spins, Dorai and Kumar, **145**, 8
- Long-range heteronuclear shift correlation
²J, ³J-HMBC: differentiation of ²J_{CH} from ³J_{CH} correlations to protonated carbons, Krishnamurthy *et al.*, **146**, 232
- Low-temperature studies
 high-power NMR probe for, Damyanovich, Peternelj, and Pintar, **144**, 1

M

- Macerals
 separated from bituminous coal, thermally excited multiplet states in, Więkowski *et al.*, **145**, 62
- Macromolecules
 NMR structure determination, direct refinement against ¹H-¹H dipolar couplings in, Tjandra, Marquardt, and Clore, **142**, 393
 rotational diffusion anisotropy, detection and quantification from NMR relaxation data, Bayesian statistical method, Andrec *et al.*, **146**, 66
- Magainin
 uniformly ¹⁵N-labeled, in oriented lipid bilayers, 3D solid-state NMR resolution of resonances of in-plane residues, Marassi *et al.*, **144**, 156
- Magic-angle oriented sample spinning
 REDOR NMR on hydrophobic peptide in oriented membranes, Middleton *et al.*, **147**, 366
- Magic-angle spinning
 compound RFDR pulse sequences for magnetization transfer by homonuclear dipolar interaction under, Fujiwara, Khandelwal, and Akutsu, **145**, 73
 CP-MAS (*see* Cross polarization-magic-angle spinning)
 double-quantum filtration under rotational-resonance conditions, Dusold and Sebald, **145**, 340
 efficient double-quantum excitation in, rotational resonance approach, Karlsson *et al.*, **145**, 95
- fast
 analysis of multiple-pulse techniques under conditions of, Filip and Hafner, **147**, 250
 heteronuclear local field NMR spectroscopy under conditions of, McElheny, De Vita, and Frydman, **143**, 321
 high frequencies, recoupling of heteronuclear dipolar interactions with rotational-echo double-resonance at, Jaroniec *et al.*, **146**, 132
 high-speed, sensitivity enhancement in solid-state ¹⁵N NMR by indirect detection with, Ishii and Tycko, **142**, 199
 initial conditions for ¹³C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, Tekely *et al.*, **145**, 173
 lipid membranes, polarization transfer in, Warschawski and Devaux, **145**, 367
- MAS double-quantum filtered dipolar shift correlation spectroscopy, Heinrichs, Geen, and Titman, **147**, 68
- MAS exchange method using sideband separation: PATROS, Reichert *et al.*, **146**, 311
 method for determination of heteronuclear distances without irradiation of second spin: relaxation-induced dipolar exchange with recoupling, Saalwächter and Schmidt-Rohr, **145**, 161
 method for setting magic angle for solid-state NMR studies, Nagaraja and Ramanathan, **146**, 165
 molecular motion characterization by ¹³C spin-lattice relaxation times, Varner, Vold, and Hoatson, **142**, 229
 multiple-quantum (*see* Multiple-quantum MAS NMR)
 multiple-rotor-cycle 2D PASS experiments with applications to ²⁰⁷Pb NMR, Vogt *et al.*, **143**, 153
¹⁵N CSA tensor magnitude and orientation in molecular frame of uracil determined via, Leppert, Heise, and Ramachandran, **145**, 307
 NH-NH vector correlation in peptides, Reif *et al.*, **145**, 132
 recoupling experiments, sideband patterns from rotor-encoded longitudinal magnetization in, De Paul *et al.*, **146**, 140
 REDOR with adiabatic dephasing pulses under, Heise, Leppert, and Ramachandran, **146**, 181
 spinning-frequency-dependent narrowband RF-driven dipolar recoupling, Goobes, Boender, and Vega, **146**, 204
 as tool for suppressing dipolar field effects in high-resolution liquid NMR, Broekaert *et al.*, **145**, 259
- Magic-angle spinning EPR
 instrumentation, performance, and limitations, Hessinger *et al.*, **147**, 217
- Magic-angle turning
 high-resolution ¹³C 3D CSA-CSA-CSA correlation experiment based on, Hu *et al.*, **145**, 230
- Magic sandwich echoes
 variant, sequence in dipolar contrast for dense tissues imaging based on, Grenier, Pascui, and Briguet, **147**, 353
- Magnetic field gradients
 bipolar, improved convection compensating PFGSE and stimulated-echo methods for use with, Sørland *et al.*, **142**, 323
 nonuniform, and restricted geometry, relaxation of nuclear magnetization in, Zielinski and Sen, **147**, 95
 sample restriction in high-resolution solid-state NMR using, Charmont *et al.*, **145**, 334
 spatially variable internal, diffusion measurements at long observation times in presence of, Seland *et al.*, **146**, 14
- Magnetic-field-gradient spinning
 EPR imaging using, Ohno and Watanabe, **143**, 274
- Magnetic fields
 inhomogeneous, NMR in, Bālibanu *et al.*, **145**, 246
 main, two-pulse nutation echoes generated by, Ardelean, Scharfenecker, and Kimmich, **144**, 45
 NMR spectrometer, red cell alignment in, evidence from diffusion tensor of water, Kuchel *et al.*, **145**, 291
 and RF field, grossly inhomogeneous, spin dynamics of CPMG-like sequences in, and application to NMR well logging, Hürlimann and Griffin, **143**, 120
- Magnetic flux noise
 MRI, 3D physical model based on current noise sources in conductor, Hennessy, **147**, 153
- Magnetic orientation
 lipid bilayers, effect of pegylation, King, Parker, and Howard, **142**, 177
- Magnetic resonance force microscopy
 high-gradient, Bloch equations in, Dougherty *et al.*, **143**, 106
- Magnetic resonance imaging
 artifact reduction in diffusion imaging using navigator echoes and velocity compensation, Clark, Barker, and Tofts, **142**, 358
 class of contrast agents for, based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
 contrast enhancement: numerical studies of intermolecular multiple-quantum coherences, Garrett-Roe and Warren, **146**, 1
 coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290
 dense tissues, dipolar contrast for, Grenier, Pascui, and Briguet, **147**, 353
 diffusion tensor data acquisition schemes in, condition number as measure of noise performance of, Skare *et al.*, **147**, 340

- electroconvection in polar organic solvent, Riley and Augustine, **144**, 288
- fMRI
- human brain, gradient-echo line scan imaging using 2D-selective RF excitation, Finsterbusch and Frahm, **147**, 17
 - human brain activation, reducing inhomogeneity artifacts in, Merboldt, Finsterbusch, and Frahm, **145**, 184
- heterogeneous materials, with turbo spin-echo single-point imaging, Beyea *et al.*, **144**, 255
- high-field ^{23}Na , sodium visibility and quantitation in intact cartilage using, Shapiro *et al.*, **142**, 24
- noise, 3D physical model based on current noise sources in conductor, Hennessy, **147**, 153
- one-dimensional, with palm-size probe, Prado, Blümich, and Schmitz, **144**, 200
- from projections, ω -space adaptive acquisition technique for, Placidi, Alecci, and Sotgiu, **143**, 197
- rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- sodium TQ-filtered, signal loss during RF excitation: model for dynamics of spins 3/2 in biological media, Hancu, van der Maarel, and Boada, **147**, 179
- spoiled gradient echo MRI sequences, quantitative interpretation of magnetization transfer in, Sled and Pike, **145**, 24
- thermal convection currents in NMR, Jerschow, **145**, 125
- Magnetic resonance microscopy
- integrated with confocal microscopy, for cellular research, Wind *et al.*, **147**, 371
- Magnetic resonance spectroscopic imaging
- exact ML estimation of spectroscopic parameters, Stoica and Sundin, **145**, 108
- Magnetic resonance spectroscopy
- exact ML estimation of spectroscopic parameters, Stoica and Sundin, **145**, 108
- Magnetic resonance tagging
- k -space analysis, Kerwin and Prince, **142**, 313
- Magnetization
- rotor-encoded longitudinal, in MAS recoupling experiments, sideband patterns from, De Paul *et al.*, **146**, 140
 - steady-state, effects of off-resonance irradiation, cross relaxation, and chemical exchange, Kingsley and Monahan, **143**, 360
 - transverse, using RF pulses long compared to T_2 , relaxation effects, Raddi and Klose, **144**, 108
- Magnetization evolution
- in tilted rotating frame of nuclear spins, tunneling spectroscopy from, Damyanovich, Peterelj, and Pintar, **145**, 1
- Magnetization grating rotation-frame imaging
- finite-difference approach for diffusion analysis in, Woelk *et al.*, **145**, 276
- Magnetization transfer
- artifact, suppression using concatenated inversion in TILT, Pruessmann *et al.*, **146**, 58
 - by homonuclear dipolar interaction under MAS, compound RFDR pulse sequences for, Fujiwara, Khandelwal, and Akutsu, **145**, 73
 - initial conditions for ^{13}C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, Tekely *et al.*, **145**, 173
 - isotropic mixing, profiles, analysis and prediction in three-spin topologies, Sahu, **147**, 121
 - via residual dipolar couplings: proton-proton correlations in partially aligned proteins, Pellicchia *et al.*, **143**, 435
 - scheme, HMQC, sensitivity enhancement of HCACO using, Xia *et al.*, **143**, 407
 - in spoiled gradient echo MRI sequences, quantitative interpretation, Sled and Pike, **145**, 24
- Mannose-binding protein
- ligand complex, geometry determination in, molecular symmetry as aid in, Al-Hashimi, Bolon, and Prestegard, **142**, 153
- Marbles
- antique, joining fragments of, ESR identification, Attanasio and Platania, **144**, 322
- MATLAB
- advanced NMR data processing toolbox: NMRLAB, Günther, Ludwig, and Rüterjans, **145**, 201
- Matrix line suppression
- zero dead time detection of electron spin echo envelope modulation: refocused primary echo, Astashkin and Raitsimring, **143**, 280
- Maximum-likelihood estimation
- exact, of spectroscopic parameters, Stoica and Sundin, **145**, 108
- Meat quality
- relationships between ^1H NMR relaxation data and technological parameters of meat, chemometric approach, Brown *et al.*, **147**, 89
- Membrane proteins
- complex, NMR-based hydrogen–deuterium amide exchange measurements, Czernski, Vinogradova, and Sanders, **142**, 111
 - helical wheels, imaging, Wang *et al.*, **144**, 162
 - orientation in micelles for solution NMR, by specific binding of lanthanide ions to added EF-hand, Ma and Opella, **146**, 381
 - uniformly ^{15}N -labeled helical, in oriented lipid bilayers, 3D solid-state NMR resolution of resonances of in-plane residues, Marassi *et al.*, **144**, 156
- Membranes
- biological, characterization by EPR spectral simulation of nitroxides, Štrancar, Šentjurc, and Schara, **142**, 254
 - lipid, polarization transfer in, Warschawski and Devaux, **145**, 367
 - oriented
 - orientation-dependent ^{19}F dipolar couplings within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
 - REDOR NMR on hydrophobic peptide in, Middleton *et al.*, **147**, 366
 - spin-labeled lipids in, simulation studies of high-field EPR spectra, Livshits and Marsh, **147**, 59
- Methemoglobin
- high-spin iron(III) complexes in glassy solvents at temperatures between 6 and 298 K, T_1 rates, Zhou *et al.*, **144**, 115
 - spin concentration, EPR quantitation method, Svistunenko *et al.*, **142**, 266
- Methyl groups
- side chains containing, in ^{13}C -labeled proteins, 3D HCCH₃-TOCSY for resonance assignment of, Uhrin *et al.*, **142**, 288
- Methylmalonic acid
- tunneling spectroscopy from magnetization evolution in tilted rotating frame of nuclear spins, Damyanovich, Peterelj, and Pintar, **145**, 1
- d_3 -Methylmalonic acid
- ^{13}C – ^2H heteronuclear distances, MAS NMR determination without irradiation of second spin: RIDER, Saalwächter and Schmidt-Rohr, **145**, 161
- α -Methyl mannose
- mannose-binding protein complex, geometry determination in, molecular symmetry as aid in, Al-Hashimi, Bolon, and Prestegard, **142**, 153
- Metmyoglobin
- high-spin iron(III) complexes in glassy solvents at temperatures between 6 and 298 K, T_1 rates, Zhou *et al.*, **144**, 115
 - spin concentration, EPR quantitation method, Svistunenko *et al.*, **142**, 266
- Micelles
- orientation of membrane proteins for solution NMR by specific binding of lanthanide ions to added EF-hand, Ma and Opella, **146**, 381
- Microscopic displacement imaging
- with pulsed-field-gradient turbo spin-echo NMR, Scheenen *et al.*, **142**, 207
- Mixed echo
- NMR in inhomogeneous magnetic fields, Bălibanu *et al.*, **145**, 246
- Mixing period
- modulated RF, in MQMAS experiments, pure absorption-mode spectra using, Vosegaard *et al.*, **143**, 217

- Mixing sequences
short, broadband heteronuclear Hartmann–Hahn sequences with short cycle times, Luy and Glaser, **142**, 369
- Mobile probe
in vivo analysis of anisotropy in tendon with NMR-MOUSE, Haken and Blümich, **144**, 195
one-dimensional imaging with NMR-MOUSE, Prado, Blümich, and Schmitz, **144**, 200
- Modeling
analytical derivation of approximation of Voigt function, Bruce *et al.*, **142**, 57
NMR baseline, FT NMR spectra, Golotvin and Williams, **146**, 122
- Modulated RF pulses
modulated RF mixing period in MQMAS experiments, pure absorption-mode spectra using, Vosegaard *et al.*, **143**, 217
- Molecular dynamics
low-frequency, studied by spin-lock adiabatic field cycling imaging, Anarado, Hauser, and Kimmich, **142**, 372
various types, effects on 1D and 2D ^2H NMR, random walk simulations, Vogel and Rössler, **147**, 43
- Molecular geometry
determination by high-order multiple-quantum evolution in solid-state NMR, Edén *et al.*, **144**, 266
- Molecular mobility
imaging of ^1H NMR second moment with ^{13}C chemical-shift resolution, Nonaka, Matsui, and Inouye, **145**, 315
- Molecular motion
in polar organic solvent, electric field-induced, MRI, Riley and Augustine, **144**, 288
in solid state, characterization by ^{13}C spin-lattice relaxation times, Varner, Vold, and Hoatson, **142**, 229
- Molecular structure
disaccharide conformation, modified GOESY in analysis of, Dixon, Widmalm, and Bull, **147**, 266
partially oriented *ortho* and *meta* benzenes codissolved in nematic liquid crystals, Syvitski and Burnell, **144**, 58
- Molecular symmetry
 C_3 , NMR spin echoes for molecular rotators with, Sullivan and Kisvarsanyi, **145**, 18
- Monolithic catalysts
thermally polarized ^1H NMR microimaging of liquid and gas flow in, Koptyug *et al.*, **147**, 36
- Monopolar gradient pulses
and bipolar gradient pulses, cross-relaxation effects in stimulated-echo-type PGSE NMR experiments by, Dvinskikh and Furó, **146**, 283
- Motion
artifacts from, in diffusion imaging, reduction using navigator echoes and velocity compensation, Clark, Barker, and Tofts, **142**, 358
calculation of cross polarization spectra influenced by slow molecular tumbling, Mayer, **145**, 216
- M2 protein
influenza A virus, transmembrane segment, 2D solid-state NMR: imaging of helical wheel, Wang *et al.*, **144**, 162
- Multidimensional dipolar exchange-assisted recoupling
measurements, in solid-state NMR, Sachleben, Beverwyk, and Frydman, **144**, 330
- Multidimensional filter diagonalization method
application to 2D projections of 2D, 3D, and 4D NMR experiments, Hu *et al.*, **144**, 357
theory and numerical implementation, Mandelshtam, **144**, 343
- Multidimensional NMR
clean TROSY: compensation for relaxation-induced artifacts, Schulte-Herbrüggen and Sørensen, **144**, 123
regularization of 2D filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
- Multifrequency EPR
high-field, using whispering gallery dielectric resonators, Annino *et al.*, **143**, 88
spectra, of molecular oxygen in solid air, Pardi *et al.*, **146**, 375
- Multiphoton resonance
in pulsed EPR, Gromov and Schweiger, **146**, 110
- Multiple echoes
two-pulse nutation echoes generated by gradients of RF amplitude and main magnetic field, Ardelean, Scharfenecker, and Kimmich, **144**, 45
- Multiple-pulse techniques
under conditions of fast MAS conditions, Filip and Hafner, **147**, 250
- Multiple-quantum cross polarization
in quadrupolar spin systems during magic-angle spinning, Rovnyak, Balduš, and Griffin, **142**, 145
with two-dimensional MQMAS NMR, of quadrupolar nuclei, Ashbrook and Wimperis, **147**, 238
- Multiple-quantum evolution
high-order, in solid-state NMR, determination of molecular geometry by, Edén *et al.*, **144**, 266
- Multiple-quantum-filtered NMR
 ^{23}Na , time-domain quantification using continuous wavelet transform analysis, Serrai *et al.*, **142**, 341
- Multiple-quantum *J*-resolved NMR spectroscopy
measurement of MQ relaxation rates and relative signs of spin coupling constants, Liu and Zhang, **146**, 277
- Multiple-quantum MAS NMR
conversion of triple- to single-quantum coherences in, Pruski, Wiench, and Amoureux, **147**, 286
modulated RF mixing period in, pure absorption-mode spectra using, Vosegaard *et al.*, **143**, 217
population and coherence transfer induced by double-frequency sweeps in half-integer quadrupolar spin systems, Iuga *et al.*, **147**, 192
two-dimensional, with multiple-quantum cross polarization, of quadrupolar nuclei, Ashbrook and Wimperis, **147**, 238
- Multiple-quantum NMR
efficient double-quantum excitation in rotational resonance NMR, Karlsson *et al.*, **145**, 95
partially oriented *ortho* and *meta* dimethyl-, dichloro-, and chloromethyl-benzenes codissolved in nematic liquid crystals, Syvitski and Burnell, **144**, 58
- Multiple-quantum spectroscopy
automatic analysis of NMR spectra of flexible molecules dissolved in liquid-crystalline phases, Castiglione *et al.*, **142**, 216
sensitivity-enhanced MQ–HCN–CCH–TOCSY and MQ–HCN–CCH–COSY pulse schemes for ^{13}C , ^{15}N -labeled RNA oligonucleotides, Hu, Jiang, and Gosser, **145**, 147
- Multiple spin systems
inorganic phosphates, measurement of dipole–dipole interactions using compensated REDOR, Chan and Eckert, **147**, 170
PISEMA in, spin dynamics, Gan, **143**, 136
- Multiple-time correlation functions
in spin-3/2 solid-state NMR spectroscopy, Böhmer, **147**, 78
- Multiplets
overlapping, in-phase selective excitation, Harris, Lowe, and Norwood, **142**, 389
- Muscle
fibers, EPR study, dielectric resonator-based side-access probe for, Sienkiewicz *et al.*, **143**, 144
relationships between ^1H NMR relaxation data and technological parameters of meat, chemometric approach, Brown *et al.*, **147**, 89

Myocardial infarction

- three-dimensional ^{13}C -spectroscopic imaging of isolated infarcted rat heart, Weidensteiner *et al.*, **143**, 17

N

 ^{14}N

- ^{13}C - ^{14}N heteronuclear distances in L-alanine, MAS NMR determination without irradiation of second spin: RIDER, Saalwächter and Schmidt-Rohr, **145**, 161
- Cu^{2+} -doped L-histidine, $^{14}\text{N}/^{35}\text{Cl}$ - $^{14}\text{N}/^{35}\text{Cl}$ and ^1H - $^{14}\text{N}/^{35}\text{Cl}$ spectra, 2D pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196
- ^{77}Se nucleus scalar coupled in 2,1,3-benzoselenadiazole to, spectral analysis, Bernatowicz *et al.*, **145**, 152

 ^{15}N

- ^{13}C , ^{15}N -labeled L-alanine, carbon-proton dipolar decoupling in REDOR, Mehta *et al.*, **145**, 156
- ^{13}C , ^{15}N -labeled proteins
- glycine, measurement of internuclear distances in solid-state NMR by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26
 - hydrophobic peptide in oriented membranes, REDOR NMR on, Middleton *et al.*, **147**, 366
- $^3J_{\text{N,Cy}}$ and $^3J_{\text{C,Cy}}$ coupling constants of aromatic residues, measurement, Löhr and Rüterjans, **146**, 126
- RAP 18–112, 3D protein NMR TROSY-type HCCH correlation experiments, diagonal peak suppression in, Meissner and Sørensen, **144**, 171
- ^{13}C , ^{15}N -labeled RNA oligonucleotides, sensitivity-enhanced MQ-HCN-CCH-TOCSY and MQ-HCN-CCH-COSY pulse schemes for, Hu, Jiang, and Gosser, **145**, 147
- ^{13}C and ^{15}N NMR spectral density maps, peptide internal motions on nanosecond time scale derived from direct fitting of, Mayo *et al.*, **146**, 188
- CSA tensor, magnitude and orientation in molecular frame of uracil determined via MAS NMR, Leppert, Heise, and Ramachandran, **145**, 307
- exchange NMR, for unambiguous assignment of $^1\text{H}^{\text{N}}/^{15}\text{N}$ resonances of proteins in complexes in slow chemical exchange with free form, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
- ^1H - ^{15}N TROSY experiments, suppression of spurious peaks in, Kojima and Kainosho, **143**, 417
- iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
- modified 2D J_{NN} -correlated [^{15}N , ^1H] TROSY for determination of internucleotide $^3J_{\text{HN}}$ couplings, Yan *et al.*, **147**, 357
- ^{15}N -labeled proteins
- $J_{\text{HN}\alpha}$ couplings in, semi-constant-time HMQC for measurement of, Aitio and Permi, **143**, 391
 - J -multiplied HMQC experiment for measuring $^3J_{\text{HN}\alpha}$ coupling constants, Xia *et al.*, **146**, 228
 - rubredoxin ^{15}N - ^1H spectra: regularization of 2D filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
- proteins with short T_2 , evaluation of cross-correlation effects and measurement of one-bond couplings, Kontaxis, Clore, and Bax, **143**, 184
- RAP 17–97, clean TROSY: compensation for relaxation-induced artifacts, Schulte-Herbrüggen and Sørensen, **144**, 123
- relaxation, separation of anisotropy and exchange broadening using ^{15}N CSA- ^{15}N - ^1H dipole-dipole relaxation cross-correlation experiments, Renner and Holak, **145**, 192
- relaxation data, determination of global τ_{R} of proteins using, Mispelter *et al.*, **143**, 229
- relaxation rates, protein backbone, as tool for diagnosis of structure quality, de Alba and Tjandra, **144**, 367
- shielding tensors in nucleic acid base pairs, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142
- solid-state NMR
- imaging membrane protein helical wheels, Wang *et al.*, **144**, 162
 - index of helical membrane protein structure and topology determined using, Marassi and Opella, **144**, 150
 - sensitivity enhancement by indirect detection with high-speed MAS, Ishii and Tycko, **142**, 199

- three-dimensional protein NMR TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}$ - $^1\text{H}^{\text{N}}$ NOESY spectra with diagonal peak suppression, Meissner and Sørensen, **142**, 195
- TROSY-based NMR experiments, protein dynamics measurements, Zhu *et al.*, **143**, 423
- ubiquitin backbone angle ψ , determination with TROSY-based α/β -HN(CO)CA- J experiment, Permi, Kilpeläinen, and Annala, **146**, 255
- uniformly labeled helical membrane proteins in oriented lipid bilayers, resonances from in-plane residues, 3D solid-state NMR resolution of, Marassi *et al.*, **144**, 156
- ^{23}Na
- ^{-1}H pairs, multiple-quantum cross polarization during MAS, Rovnyak, Baldus, and Griffin, **142**, 145
 - multiple-quantum cross polarization with 2D MQMAS NMR, Ashbrook and Wimperis, **147**, 238
 - multiple-quantum-filtered signal, time-domain quantification using continuous wavelet transform analysis, Serrai *et al.*, **142**, 341
 - $\text{Na}_2\text{HTm}[\text{DOTP}]$, temperature-dependent chemical shift and relaxation times, Shapiro *et al.*, **143**, 213
 - NMR microimaging, of intact plants, Olt *et al.*, **144**, 297
 - visibility and quantitation in intact cartilage using high-field ^{23}Na MRI and MRS, Shapiro *et al.*, **142**, 24
- $\text{Na}_2\text{HTm}[\text{DOTP}]$
- ^{23}Na in, temperature-dependent chemical shift and relaxation times, Shapiro *et al.*, **143**, 213
- Naphthyridines
- interacting with *Torpedo californica* acetylcholinesterase, ^1H NMR relaxation study, Delfini *et al.*, **144**, 129
- Navigator echoes
- and velocity compensation, reduction of motion artifacts in diffusion imaging using, Clark, Barker, and Tofts, **142**, 358
- NH-NH vector correlation
- in peptides, by solid-state NMR, Reif *et al.*, **145**, 132
- Nitrobenzene
- aligned by strong AC electric fields, dipolar interactions in, Peshkovsky and McDermott, **147**, 104
 - electroconvection in, magnetic resonance imaging, Riley and Augustine, **144**, 288
- 2-Nitrobenzoic acid
- hydrogen disorder in, ^1H - ^{17}O NQR double-resonance study, Torkar, Žagar, and Seliger, **144**, 13
- Nitroxide biradicals
- dead-time-free measurements of dipole-dipole interactions between electron spins, Pannier *et al.*, **142**, 331
- Nitroxides
- EPR spectral simulation, characterization of biological membranes, Štrancar, Šentjarc, and Schara, **142**, 254
 - spin probe, pulsed EPR study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364
- NMR
- advanced data processing in MATLAB: NMRLAB, Günther, Ludwig, and Rüterjans, **145**, 201
 - ^{13}C , human brain at 1.5 T *in vivo*, peak assignments, Blüml *et al.*, **143**, 292
 - ^{13}C and ^{15}N , spectral density maps, peptide internal motions on nanosecond time scale derived from direct fitting of, Mayo *et al.*, **146**, 188
 - characterization of salt water ice: pore structure and anisotropic self-diffusion, Menzel *et al.*, **143**, 376
 - diffusion measurements using nonlinear stimulated echo, Ardelean and Kimmich, **143**, 101
 - experiments with pulsed-field gradients, computer program for simulation: Virtual NMR Spectrometer, Nicholas *et al.*, **145**, 262

- ¹H
in vitro monitoring of effects of oxygen level on total choline levels in bioartificial pancreas, Lokeng *et al.*, **146**, 49
protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, Bertini *et al.*, **147**, 1
second moment imaging with ¹³C chemical-shift resolution, Nonaka, Matsui, and Inouye, **145**, 315
thermally polarized ¹H NMR microimaging of liquid and gas flow in monolithic catalysts, Koptyug *et al.*, **147**, 36
- ²H, 1D and 2D, effects of various types of molecular dynamics, random walk simulations, Vogel and Rössler, **147**, 43
heteronuclear local field, under fast MAS conditions, McElheny, De Vita, and Frydman, **143**, 321
in inhomogeneous magnetic fields, Bălibanu *et al.*, **145**, 246
intermolecular dipole–dipole relaxation of ¹²⁹Xe dissolved in water, Dimitrov, Reddy, and Leigh, **145**, 302
low-resolution, measurements, in stable reconstruction of *T*₂ distribution, Steinbrecher *et al.*, **146**, 321
- ²³Na, sodium visibility and quantitation in intact cartilage using, Shapiro *et al.*, **142**, 24
²⁰⁷Pb, multiple-rotor-cycle 2D PASS with applications to, Vogt *et al.*, **143**, 153
phase angle measurement from peak areas: PAMPAS, Džakula, **146**, 20
sample coil, method for measuring Q value, Jiang, **142**, 386
separation of quadrupolar and magnetic contributions to spin-lattice relaxation in case of single isotope, Suter *et al.*, **143**, 266
solid deuterium, separation of ortho and para signals via DQ filtering, Malmi *et al.*, **145**, 326
- spectra
normalization, time-domain algorithm for, Romano, Santini, and Indovina, **146**, 89
partially oriented *ortho* and *meta* benzenes codissolved in nematic liquid crystals, Syvitski and Burnell, **144**, 58
quantification, analytical derivation of approximation of Voigt function for, Bruce *et al.*, **142**, 57
*T*₁ noise and sensitivity in PFG experiments, Lin *et al.*, **144**, 6
TROSSY-based, protein dynamics measurements, Zhu *et al.*, **143**, 423
- NMR baseline recognition and modeling
FT NMR spectra, improved, Golotvin and Williams, **146**, 122
- NMRLAB
advanced NMR data processing in MATLAB, Günther, Ludwig, and Rüterjans, **145**, 201
- NMR microscopy
²³Na and ¹H microimaging of intact plants, Olt *et al.*, **144**, 297
relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
- NMR-MOUSE
in vivo analysis of anisotropy in tendon, Haken and Blümich, **144**, 195
nuclear magnetic resonance in inhomogeneous magnetic fields, Bălibanu *et al.*, **145**, 246
one-dimensional imaging with, Prado, Blümich, and Schmitz, **144**, 200
- NMR probe
high-power, for low-temperature studies, Damyanovich, Peternejl, and Pintar, **144**, 1
small-volume flow probe for automated direct-injection NMR analysis, Haner, Llanos, and Mueller, **143**, 69
- NMR probe circuits
remote tuning, Kodibagkar and Conradi, **144**, 53
- NMR relaxation (*see* Relaxation, NMR)
- NMR spin systems
nonlinear identification by adaptive filtering, Asfour, Raoof, and Fournier, **145**, 37
- NMR well logging
application of spin dynamics of CPMG-like sequences in grossly inhomogeneous *B*₀ and *B*₁ fields, Hürlimann and Griffin, **143**, 120
- NOE enhancement
polarization transfer in lipid membranes, Warschawski and Devaux, **145**, 367
- NOESY
iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
three-dimensional protein NMR TROSSY-type ¹⁵N-resolved ¹H^N–¹H^N spectra, with diagonal peak suppression, Meissner and Sørensen, **142**, 195
- Noise
with diffusion tensor data acquisition schemes with MRI, condition number as measure of, Skare *et al.*, **147**, 340
MRI, 3D physical model based on current noise sources in conductor, Hennessy, **147**, 153
*T*₁, in pulsed-field-gradient experiments, Lin *et al.*, **144**, 6
- Nonlinear adaptive filtering
identification of NMR spin systems by, Asfour, Raoof, and Fournier, **145**, 37
- Nonlinear least squares
comparison of spectral estimation of NMR relaxation with, Naugler and Cushley, **145**, 209
frequency-selective quantitation of biomedical MRS data, Vanhamme *et al.*, **143**, 1
- Nonlinear phase adjustment
selective excitation pulses, Carlson, **147**, 210
- Normalization
NMR spectra, time-domain algorithm for, Romano, Santini, and Indovina, **146**, 89
- Nuclear magnetic resonance
phonon-assisted spin diffusion in solids, Dolinšek, Cereghetti, and Kind, **146**, 335
- Nuclear magnetization
relaxation in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
- Nuclear Overhauser effects
intermolecular ¹²⁹Xe–¹H, and role of dipolar coupling in relaxation of ¹²⁹Xe in water, Dimitrov, Reddy, and Leigh, **145**, 302
- Nuclear Overhauser enhancement
1D, modified GOESY in analysis of disaccharide conformation, Dixon, Widmalm, and Bull, **147**, 266
- Nuclear quadrupole coupling constants
in isotopically labeled saccharides, ²H *T*₁ and, Bose-Basu *et al.*, **144**, 207
- Nuclear quadrupole double resonance
¹H–¹⁷O, study of hydrogen disorder in 2-nitrobenzoic acid, Torkar, Žagar, and Seliger, **144**, 13
- Nuclear quadrupole resonance
detection of explosives: modification of receiver operating characteristics using feedback, Blauch, Schiano, and Ginsberg, **144**, 305
pure NQR of spin *I* = $\frac{3}{2}$ powder sample, broadband echo sequence using π composite pulse for, Odin, **143**, 299
- Nuclear resonance signals
detection: modification of receiver operating characteristics using feedback, Blauch, Schiano, and Ginsberg, **144**, 305
- Nuclear rotating frame
high-frequency dynamic nuclear polarization in, Farrar *et al.*, **144**, 134
- Nuclear spins
tilted rotating frame, magnetization evolution in, tunneling spectroscopy from, Damyanovich, Peternejl, and Pintar, **145**, 1
- Nucleic acids
base pairs, ¹⁵N and ¹H shielding tensors in, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142

- Nucleotides
 evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
- Numerical Laplace transform inversion
 stable reconstruction of T_2 distribution, Steinbrecher *et al.*, **146**, 321
- Numerical simulations
 double-quantum filtration under rotational-resonance conditions, Dusold and Sebald, **145**, 340
 intermolecular multiple-quantum coherences: NMR and MRI, Garrett-Roe and Warren, **146**, 1
- Nutation
 two-pulse nutation echoes generated by gradients of RF amplitude and main magnetic field, Ardelean, Scharfenecker, and Kimmich, **144**, 45
- Nutation spin echo
 and use for localized NMR, Ardelean, Kimmich, and Klemm, **146**, 43
- O
- ^{17}O
 ^1H - ^{17}O NQR double-resonance study of hydrogen disorder in 2-nitrobenzoic acid, Torkar, Žagar, and Seliger, **144**, 13
 multiple-quantum cross polarization with 2D MQMAS NMR, Ashbrook and Wimperis, **147**, 238
 ^{17}O -decoupled ^1H spectroscopy and imaging with surface coil: STEAM decoupling, Charagundla *et al.*, **143**, 39
- ^{18}O
 H_2 ^{18}O solvent-induced isotope shift in ^{19}F NMR, Arnold and Fisher, **142**, 1
- Object
 general, spin- $\frac{1}{2}$ coupled to, coherent cross polarization theory for, Magusin and Veeman, **143**, 243
- ODESSA
 initial conditions for ^{13}C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, Tekely *et al.*, **145**, 173
 tr-ODESSA combined with PASS: PATROS, Reichert *et al.*, **146**, 311
- Off-resonance effects
 in multiple-site kinetic measurements, correcting for, Kingsley and Monahan, **146**, 100
 radiofrequency pulses used in spectral editing with double-quantum coherence transfer, Lei and Peeling, **144**, 89
- Off-resonance irradiation
 effect on steady-state magnetization and effective T_1 relaxation times, Kingsley and Monahan, **143**, 360
- Oligonucleotides
 RNA ^{13}C , ^{15}N -labeled, sensitivity-enhanced MQ-HCN-CCH-TOCSY and MQ-HCN-CCH-COSY pulse schemes for, Hu, Jiang, and Gosser, **145**, 147
- ω -space adaptive acquisition technique
 for MRI from projections, Placidi, Alecci, and Sotgiu, **143**, 197
- One-bond couplings
 measurement in proteins with short transverse relaxation times, Kontaxis, Clore, and Bax, **143**, 184
- One-dimensional NMR
 ^2H , effects of various types of molecular dynamics, random walk simulations, Vogel and Rössler, **147**, 43
- One-pulse experiment
 systems with chemical exchange, measurement of T_1 and concentrations, Spencer and Fishbein, **142**, 120
- Oocytes
Xenopus, integrated confocal and magnetic resonance microscopy, Wind *et al.*, **147**, 371
- Optical pumping
 continuous-flow, in closed circuit system, Kneller *et al.*, **147**, 261
- Order matrix
 variation of molecular alignment for resolving orientational ambiguities in protein structures from dipolar couplings, Al-Hashimi *et al.*, **143**, 402
- Order parameters
 nitrobenzene molecular alignment in strong AC electric fields: dipolar interactions, Peshkovsky and McDermott, **147**, 104
 partially oriented *ortho* and *meta* benzenes codissolved in nematic liquid crystals, Syvitski and Burnell, **144**, 58
- Orientation
 ambiguity, resolution in protein structures from dipolar couplings, variation of molecular alignment as means of, Al-Hashimi *et al.*, **143**, 402
 magnetic, lipid bilayers, effect of pegylation, King, Parker, and Howard, **142**, 177
- Oriental restraints
 from solid-state NMR, atomic refinement using, Bertram *et al.*, **147**, 9
- Oriented membranes
 orientation-dependent ^{19}F dipolar couplings within trifluoromethyl group, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
 REDOR NMR on hydrophobic peptide in, Middleton *et al.*, **147**, 366
- Oriented molecule
 solid-state NMR studies, method for setting magic angle for, Nagaraja and Ramanathan, **146**, 165
- Oriented samples
 transmembrane peptide of influenza A virus M2 protein, spectra: imaging of helical wheel, Wang *et al.*, **144**, 162
- Ortho molecules
 ortho and para NMR signals in solid deuterium, separation via DQ filtering, Malmi *et al.*, **145**, 326
- Oscillating gradient spin-echo
 pulse sequence, measurements of restricted diffusion using, Schachter *et al.*, **147**, 232
- Oscillation
 coherent cross polarization theory for spin- $\frac{1}{2}$ coupled to general object, Magusin and Veeman, **143**, 243
- Overhauser effect
 in ^1H dynamic nuclear polarization in supercritical ethylene at 1.4 T, Wind *et al.*, **143**, 233
- Overlapping peaks
 parametric estimation, Cramér-Rao bound expressions for, Cavassila *et al.*, **143**, 311
- Overlapping spectra
 electron nuclear quadruple resonance for assignment of, Bowman and Tyryshkin, **144**, 74
- Oxygen
 molecular, in solid air, multifrequency EPR spectra of, Pardi *et al.*, **146**, 375
- P
- ^{31}P
 inorganic phosphate multispin systems, measurement of dipole-dipole interactions using compensated REDOR, Chan and Eckert, **147**, 170
 $(\text{NH}_4)_2\text{HPO}_4$, variable-temperature single-crystal NMR, small crystals and small coils in, Vosegaard *et al.*, **142**, 379
 NMR, multiple-site saturation transfer kinetic measurements, correcting for incomplete saturation and off-resonance effects, Kingsley and Monahan, **146**, 100
- PAMPAS
 phase angle measurement from peak areas, Džakula, **146**, 20
- Pancreas
 bioartificial, *in vitro* monitoring of total choline levels: ^1H NMR studies of effects of oxygen level, Long *et al.*, **146**, 49
- Parallel coil resonators
 for time-domain RF EPR imaging of biological objects, Devasahayam *et al.*, **142**, 168
- Paramagnetic effects
 iron(III) species on nuclear magnetic relaxation of fluid protons in porous media, Bryar, Daughney, and Knight, **142**, 74

- Paramagnetic proteins
and protein gels, decay of dipolar order in, Danek and Bryant, **143**, 35
- Para molecules
ortho and para NMR signals in solid deuterium, separation via DQ filtering, Malmi *et al.*, **145**, 326
- Partial saturation
one-pulse experiment with chemical exchange, Spencer and Fishbein, **142**, 120
- PASS
with tr-ODESSA: PATROS, Reichert *et al.*, **146**, 311
two-dimensional, multiple-rotor-cycle, with applications to ^{207}Pb NMR spectroscopy, Vogt *et al.*, **143**, 153
- PATROS
MAS exchange method using sideband separation, Reichert *et al.*, **146**, 311
- ^{207}Pb
lead nitrate, thermometer for nonspinning solid-state NMR spectroscopy, Beckmann and Dybowski, **146**, 379
- ^{207}Pb NMR
multiple-rotor-cycle 2D PASS with applications to, Vogt *et al.*, **143**, 153
- Peak assignments
in vivo ^{13}C MRS in human brain at 1.5 T, Blüml *et al.*, **143**, 292
- Peak integration
phase angle measurement from peak areas: PAMPAS, Džakula, **146**, 20
- Peak suppression
water, time-frequency vs time-scale approach, Antoine, Coron, and Dereppe, **144**, 189
- Pegylation
magnetically oriented lipid bilayers, King, Parker, and Howard, **142**, 177
4-*n*-Pentyl-4'-cyanobiphenyl
liquid crystalline, application of improved broadband decoupling sequence with, Fung, Khitrin, and Ermolaev, **142**, 97
- Peptides
hydrophobic, in oriented membranes, REDOR NMR on, Middleton *et al.*, **147**, 366
internal motions on nanosecond time scale, derived from direct fitting of ^{13}C and ^{15}N NMR spectral density maps, Mayo *et al.*, **146**, 188
J-coupling determination: application of heteronuclear ACT spectroscopy, Koźmiński and Nanz, **142**, 294
NH–NH vector correlation by solid-state NMR, Reif *et al.*, **145**, 132
 ^{15}N solid-state NMR, sensitivity enhancement by indirect detection with high-speed MAS, Ishii and Tycko, **142**, 199
- Phantoms
gel, rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- Phase-adjusted spinning sidebands (*see* PASS)
- Phase angle measurement from peak areas
PAMPAS, Džakula, **146**, 20
- Phase correction
phase angle measurement from peak areas: PAMPAS, Džakula, **146**, 20
- Phase cycles
minimum cycle length, construction: MakeCycle, Ollerenshaw and McClung, **143**, 255
- Phase modulation
recoupling pulses on ^2H spins, deuterium–carbon REDOR NMR spectroscopy with, Sack and Vega, **145**, 52
- Phases
signs of, Levitt and Johannessen, **142**, 190
- Phase shifts
in large spectral data sets, automatic correction, Witjes *et al.*, **144**, 35
- Ph–CH₂–X
X=Br,H, flexible molecules dissolved in liquid-crystalline phases, automatic analysis of NMR spectra, Castiglione *et al.*, **142**, 216
- Phonons
phonon-assisted spin diffusion in solids, Dolinšek, Cereghetti, and Kind, **146**, 335
- Phosphates
inorganic, compensated REDOR NMR applied to, Chan and Eckert, **147**, 170
- Phosphoglycerate mutase
 ^{15}N , ^{13}C -labeled, methyl-containing side chains, 3D HCCH₃-TOCSY for resonance assignment, Uhrin *et al.*, **142**, 288
- Phospholamban
in oriented membranes, REDOR NMR on, Middleton *et al.*, **147**, 366
- PISA wheels
solid-state NMR index of helical membrane protein structure and topology, Marassi and Opella, **144**, 150
- PISEMA
imaging membrane protein helical wheels, Wang *et al.*, **144**, 162
in multiple spin systems, spin dynamics, Gan, **143**, 136
solid-state NMR index of helical membrane protein structure and topology, Marassi and Opella, **144**, 150
- Plants
intact, ^{23}Na and ^1H NMR microimaging, Olt *et al.*, **144**, 297
microscopic displacement imaging with PFG turbo spin-echo NMR, Scheenen *et al.*, **142**, 207
- Point-like sample
radial and longitudinal effect in double TE₁₀₄ and single TE₁₀₂ rectangular cavity, Mazúr, Valko, and Morris, **142**, 37
- Polarization inversion spin exchange at the magic angle (*see* PISEMA)
- Polarization transfer
in lipid membranes, Warschawski and Devaux, **145**, 367
- Polarization transfer functions
analytical, for three dipolar coupled spins $\frac{1}{2}$, Luy and Glaser, **142**, 280
- Polar organic solvent
electroconvection in, magnetic resonance imaging, Riley and Augustine, **144**, 288
- Pollen
intracellular glasses, pulsed EPR study, Buitink *et al.*, **142**, 364
- Poly(1-butene)
isotactic, mixture with dimethyl sulfone, pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- Poly(*n*-butyl methacrylate)
application of PATROS: MAS exchange method using sideband separation, Reichert *et al.*, **146**, 311
chain dynamics in, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
- Polyethylene glycol
pegylation of magnetically oriented lipid bilayers, King, Parker, and Howard, **142**, 177
- Polymers
solid, and blends, WIM/WISE NMR studies of chain dynamics in, Qiu and Mirau, **142**, 183
- Polystyrene
–poly(vinyl methyl ether) blends, chain dynamics in, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
- Poly(vinyl methyl ether)
–polystyrene blends, chain dynamics in, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
- Population transfer
induced by double-frequency sweeps in half-integer quadrupolar spin systems, Iuga *et al.*, **147**, 192
- Pore size
determination using internal magnetic field, Song, **143**, 397
- Porous media
chemical-shift imaging with continuously flowing hyperpolarized xenon for characterization of, Moudrakovski *et al.*, **144**, 372

- measurements of restricted diffusion using oscillating gradient spin-echo sequence, Schachter *et al.*, **147**, 232
- nuclear magnetic relaxation of fluid protons in, paramagnetic effects of iron(III) species, Bryar, Daughney, and Knight, **142**, 74
- pore size determination using internal magnetic field, Song, **143**, 397
- salt water ice, NMR characterization of pore structure and anisotropic self-diffusion, Menzel *et al.*, **143**, 376
- turbo spin-echo single-point imaging, Beyea *et al.*, **144**, 255
- Porous systems
- microscopic displacement imaging with PFG turbo spin-echo NMR, Scheenen *et al.*, **142**, 207
- Position encoding
- correlations of position, velocity, and acceleration in fluid transport, 2D PFG NMR for, Han, Stapf, and Blümich, **146**, 169
- Powder sample
- spin $I = \frac{3}{2}$, pure NQR, broadband echo sequence using π composite pulse for, Odin, **143**, 299
- Powder spectra
- dip in powder deuterium NMR lineshapes, Westlund, **145**, 364
- Prior knowledge
- influence on parametric estimation of overlapping peaks: Cramér-Rao bound expressions, Cavassila *et al.*, **143**, 311
- Product operator states
- J -coupled spin evolution in IS spin system during RF irradiation of one spin, vector and quantum representations, Bendall and Skinner, **143**, 329
- Projections
- magnetic resonance imaging from, ω -space adaptive acquisition technique for, Placidi, Alecci, and Sotgiu, **143**, 197
- Propagator
- diffusion, in sea water ice, NMR characterization: pore structure and anisotropic self-diffusion, Menzel *et al.*, **143**, 376
- Protein–DNA complex
- time-shared $X(\omega_i)$ -half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168
- Protein dynamics
- measurements, TROSY-based NMR, Zhu *et al.*, **143**, 423
- Protein fold
- orientational ambiguities in protein structure from dipolar couplings, variation of molecular alignment for resolving, Al-Hashimi *et al.*, **143**, 402
- Protein gels
- diamagnetic and paramagnetic, decay of dipolar order in, Danek and Bryant, **143**, 35
- Protein NMR
- protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, ^1H NMR study, Bertini *et al.*, **147**, 1
 - regularization of 2D filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
 - three-dimensional TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}\text{--}^1\text{H}^{\text{N}}$ NOESY spectra with diagonal peak suppression, Meissner and Sørensen, **142**, 195
- Proteins
- backbone angle ψ , determination with TROSY-based α/β -HN(CO)CA- J experiment, Permi, Kilpeläinen, and Annala, **146**, 255
 - in complexes, in slow chemical exchange with free form, ^{15}N exchange NMR for unambiguous assignment of $^1\text{H}^{\text{N}}/^{15}\text{N}$ resonances, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
 - ^{13}C - or ^{13}C , ^{15}N -labeled (*see* ^{13}C)
 - diamagnetic and paramagnetic, decay of dipolar order in, Danek and Bryant, **143**, 35
 - global τ_{R} , determination using ^{13}C or ^{15}N relaxation data, Mispelter *et al.*, **143**, 229
 - $^1\text{H}\text{--}^{15}\text{N}$ TROSY experiments, suppression of spurious peaks, Kojima and Kainosho, **143**, 417
 - hydrogen bonds
 - 3J coupling between C^α and H^{N} across, Meissner and Sørensen, **143**, 431
 - techniques for measurement of C^{N} and $\text{C}^{\text{H}}^{\text{N}}$ J -coupling constants across, Meissner and Sørensen, **143**, 387
 - iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
 - ^{15}N -labeled (*see* ^{15}N)
 - partially aligned, proton–proton correlations: magnetization transfer via residual dipolar couplings, Pellecchia *et al.*, **143**, 435
 - with short transverse relaxation times, evaluation of cross-correlation effects and measurement of one-bond couplings, Kontaxis, Clore, and Bax, **143**, 184
- Protein structure
- atomic refinement using orientational restraints from solid-state NMR, Bertram *et al.*, **147**, 9
 - NMR structures, refinement against torsion angle potentials of mean force, problem sources and solutions, Kuszewski and Clore, **146**, 249
 - proton–proton correlations in partially aligned proteins: magnetization transfer via residual dipolar couplings, Pellecchia *et al.*, **143**, 435
 - α -spectrin SH3 domain: sample optimization and identification of signal patterns of amino acid side chains in 2D RFDR spectra, Pauli *et al.*, **143**, 411
 - structure validation factor based on backbone ^{15}N relaxation rates, de Alba and Tjandra, **144**, 367
 - uniformly ^{15}N -labeled helical membrane proteins in oriented lipid bilayers, resonances from in-plane residues, 3D solid-state NMR resolution of, Marassi *et al.*, **144**, 156
- Proton chemical exchange
- dependent saturation transfer, class of MRI contrast agents based on, Ward, Aletras, and Balaban, **143**, 79
- Proton detection
- carbon–carbon spin coupling constants in symmetrical molecules, Berger, **142**, 136
- Proton exchange
- protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, ^1H NMR study, Bertini *et al.*, **147**, 1
- Proton hydrophilicity
- protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, ^1H NMR study, Bertini *et al.*, **147**, 1
- Proton NMR
- microimaging of intact plants, Olt *et al.*, **144**, 297
 - spectra of flexible molecules dissolved in liquid-crystalline phases, automatic analysis, Castiglione *et al.*, **142**, 216
 - T_1 of fluid protons in porous media, paramagnetic effects of iron(III) species, Bryar, Daughney, and Knight, **142**, 74
 - T_1 rates of inhibitors interacting with *Torpedo californica* acetylcholinesterase, Delfini *et al.*, **144**, 129
- Proton NMR spectroscopic imaging
- ^1H U-FLARE, fast variant using adjusted chemical shift phase encoding, Ebel, Dreher, and Leibfritz, **142**, 241
- Protons
- dipolar linked, in biological tissues: dipolar contrast for dense tissues imaging, Grenier, Pascui, and Briguët, **147**, 353
- Pulsed EPR
- with L-band crossed-loop EPR resonator, Rinard, Quine, and Eaton, **144**, 85
 - multi-photon resonances in, Gromov and Schweiger, **146**, 110
 - overlapping spectra, assignment, electron nuclear quadrupole resonance for, Bowman and Tyryshkin, **144**, 74
 - spin-probe study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364
 - three-dimensional, using Fourier imaging, Feintuch *et al.*, **142**, 382
 - two-dimensional ENDOR-ESEEM correlation spectroscopy, Bar *et al.*, **145**, 115
 - two-dimensional pulsed TRIPLE at 95 GHz, Epel and Goldfarb, **146**, 196

Pulsed field-cycled EPR
 detection of anisotropic hyperfine transitions in zero magnetic field, Sturm *et al.*, **142**, 139

Pulsed-field gradient NMR
 correlation time and diffusion coefficient imaging for granular flows, Caprihan and Seymour, **144**, 96
 electric field, measurement of anisotropic diffusion in nematic liquid crystal, Holstein *et al.*, **143**, 427
 T_1 noise and sensitivity in, Lin *et al.*, **144**, 6
 two-dimensional, for encoding correlations of position, velocity, and acceleration in fluid transport, Han, Stapf, and Blümich, **146**, 169

Pulsed-field gradients
 NMR experiments involving, computer program for simulation: Virtual NMR Spectrometer, Nicholas *et al.*, **145**, 262

Pulsed-field-gradient spin-echo NMR
 ^{13}C , with heteronuclear dipolar decoupling, diffusion measurements in liquid crystals and solids, Dvinskikh, Sitnikov, and Furó, **142**, 102
 convection compensating, improved, Sørland *et al.*, **142**, 323

Pulsed-field-gradient turbo spin-echo NMR
 microscopic displacement imaging with, Scheenen *et al.*, **142**, 207

Pulsed gradient spin-echo NMR
 with homonuclear dipolar decoupling, Dvinskikh and Furó, **144**, 142
 red cell alignment in magnetic field of spectrometer, evidence based on diffusion tensor of water, Kuchel *et al.*, **145**, 291
 stimulated-echo-type experiments, cross-relaxation effects by bipolar and monopolar gradient pulses, Dvinskikh and Furó, **146**, 283

Pulse repetition rate
 effect in continuous-flow optical pumping NMR in closed circuit system, Kneller *et al.*, **147**, 261

Pulse sequences
 compound RFDR, for magnetization transfer by homonuclear dipolar interaction under MAS, Fujiwara, Khandelwal, and Akutsu, **145**, 73
 generation of phase cycle of minimum length for, algorithm, Ollerenshaw and McClung, **143**, 255
 k -space analysis of MR tagging, Kerwin and Prince, **142**, 313

Pulse shaping
 in water presaturation experiments, strange effects, Kupče and Freeman, **146**, 240

Pure absorption-mode spectra
 using modulated RF mixing period in MQMAS experiments, Vosegaard *et al.*, **143**, 217

Pure-exchange NMR
 solid-state, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86

Purines
 ^{15}N and ^1H shielding tensors in, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142

Pyrimidines
 ^{15}N and ^1H shielding tensors in, hydrogen bonding effects, Czernek, Fiala, and Sklenář, **145**, 142

Q

Quadrupolar nuclei
 ^{59}Co , tetrahedral cluster $\text{HFeCo}_3(\text{CO})_{11}\text{PPh}_2\text{H}$, application of 2D COSY for $S=7/2$ spins, Kempgens *et al.*, **142**, 64
 conversion of triple- to single-quantum coherences in MQMAS NMR, Pruski, Wiench, and Amoureux, **147**, 286
 multiple-quantum cross polarization and 2D MQMAS NMR, Ashbrook and Wimperis, **147**, 238
 multiple-time correlation functions in spin-3/2 solid-state NMR spectroscopy, Böhmer, **147**, 78
 ^{14}N , spin-1/2 scalar nucleus coupled to: analysis of ^{77}Se spectra in 2,1,3-benzoselenadiazole, Bernatowicz *et al.*, **145**, 152

Quadrupolar relaxation
 separation of quadrupolar and magnetic contributions to spin-lattice relaxation in case of single isotope, Suter *et al.*, **143**, 266

Quadrupolar spin systems
 half-integer, double-frequency sweeps in, population and coherence transfer induced by, Iuga *et al.*, **147**, 192
 multiple-quantum cross polarization during magic-angle spinning, Rovnyak, Baldus, and Griffin, **142**, 145

Quality factor
 method for measuring Q value of NMR sample coil, Jiang, **142**, 386

Quantitation
 Cramér-Rao bound expressions for parametric estimation of overlapping peaks: influence of prior knowledge, Cavassila *et al.*, **143**, 311

Quantitative EPR
 radial and longitudinal effect in double TE_{104} and single TE_{102} rectangular cavity, Mazúr, Valko, and Morris, **142**, 37

Quantitative Γ experiment
 avoiding cross-correlated relaxation rate measurement errors, Carlomagno and Griesinger, **144**, 280

Quantitative imaging
 analysis of magnetization transfer in spoiled gradient echo MRI sequences, Sled and Pike, **145**, 24

Quantum mechanical representations
 J -coupled spin evolution in IS spin system during RF irradiation of one spin, comparison with vector models, Bendall and Skinner, **143**, 329

Quasioptical EPR
 Jones matrix formalism for, Budil *et al.*, **144**, 20

R

Radial effect
 and longitudinal effect, in double TE_{104} and single TE_{102} rectangular cavity, Mazúr, Valko, and Morris, **142**, 37

Radial turbo spin-echo sequence
 high-resolution diffusion imaging using, Seifert *et al.*, **144**, 243

Radiation damping
 and toroid cavity detectors for high-resolution NMR and rotating-frame imaging, Momot *et al.*, **142**, 348

Radiofrequency amplitude gradients
 two-pulse nutation echoes generated by, Ardelean, Scharfenecker, and Kimmich, **144**, 45

Radiofrequency-driven recoupling (*see* RFDR spectroscopy)

Radiofrequency excitation
 signal loss during, in TQ-filtered sodium MRI: model for dynamics of spins 3/2 in biological media, Hancu, van der Maarel, and Boada, **147**, 179
 two-dimensional-selective, gradient-echo line scan imaging using, Finsterbusch and Frahm, **147**, 17

Radiofrequency field
 and magnetic field, grossly inhomogeneous, spin dynamics of CPMG-like sequences in, and application to NMR well logging, Hürlimann and Griffin, **143**, 120
 relationship to radial position in toroid cavity probes, Woelk, **146**, 157
 spin-locking, NMR relaxation in multipolar AMX under conditions of, Kaikkonen and Kowalewski, **146**, 297

Radiofrequency field gradient
 single-coil surface imaging using, Baril *et al.*, **146**, 223

Radiofrequency irradiation
 one spin, J -coupled spin evolution in IS spin system during, vector and quantum representations, Bendall and Skinner, **143**, 329

Radiofrequency mixing
 effects on signs of frequencies and phases in NMR, Levitt and Johannessen, **142**, 190

Radiofrequency phases
 in NMR, signs: role of radiofrequency mixing, Levitt and Johannessen, **142**, 190

- Radiofrequency pulses
 concatenation, for spatially selective inversion, Pruessmann *et al.*, **146**, 58
 long compared to T_2 , relaxation effects using, Raddi and Klose, **144**, 108
 modulated RF mixing period in MQMAS experiments, pure absorption-mode spectra using, Vosegaard *et al.*, **143**, 217
 T_1 noise and sensitivity in PFG experiments, Lin *et al.*, **144**, 6
 used in spectral editing with double-quantum coherence transfer, off-resonance effects, Lei and Peeling, **144**, 89
- Radiofrequency time-domain EPR imaging
 biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168
- Radiofrequency waveform
 nonlinear phase adjustment of selective excitation pulses, Carlson, **147**, 210
- Random walk simulations
 effects of various types of molecular dynamics on 1D and 2D ^2H NMR, Vogel and Rössler, **147**, 43
- Rayleigh–Bénard convection
 visualization in vertical cylindrical tube by MRI, Jerschow, **145**, 125
- ^{87}Rb
 RbNO_3 and LiRbSO_4 , conversion of triple- to single-quantum coherences in MQMAS NMR, Pruski, Wiench, and Amoureux, **147**, 286
 $\text{RbZn}_2(\text{HPO}_4)\text{PO}_4$, variable-temperature single-crystal NMR, small crystals and small coils in, Vosegaard *et al.*, **142**, 379
- Receiver operating characteristics
 modification using feedback: detection of nuclear resonance signals, Blauch, Schiano, and Ginsberg, **144**, 305
- Recoupling
 compound RFDR pulse sequences for magnetization transfer by homonuclear dipolar interaction under MAS, Fujiwara, Khandelwal, and Akutsu, **145**, 73
 heteronuclear dipolar interactions, with rotational-echo double-resonance at high MAS frequencies, Jaroniec *et al.*, **146**, 132
 magic-angle spinning, sideband patterns from rotor-encoded longitudinal magnetization in, De Paul *et al.*, **146**, 140
 relaxation-induced dipolar exchange with recoupling: MAS NMR method for determination of heteronuclear distances without irradiation of second spin, Saalwächter and Schmidt-Rohr, **145**, 161
 T-MREV scheme, in NH–NH vector correlation in peptides by solid-state NMR, Reif *et al.*, **145**, 132
- Rectangular cavity
 double TE_{104} and single TE_{102} , radial and longitudinal effect in, Mazúr, Valko, and Morris, **142**, 37
- REDOR
 with adiabatic dephasing pulses, Heise, Leppert, and Ramachandran, **146**, 181
 background-filtered, measurement of internuclear distances in solid-state NMR, Vogt *et al.*, **147**, 26
 carbon-proton dipolar decoupling in, Mehta *et al.*, **145**, 156
 comparison with RIDER method for MAS determination of heteronuclear distances without irradiation of second spin: relaxation-induced dipolar exchange with recoupling, Saalwächter and Schmidt-Rohr, **145**, 161
 compensated, applied to inorganic phosphates: dipolar coupling information in multispin systems, Chan and Eckert, **147**, 170
 efficient deuterium–carbon REDOR NMR spectroscopy, Sack and Vega, **145**, 52
 at high MAS frequencies, recoupling of heteronuclear dipolar interactions with, Jaroniec *et al.*, **146**, 132
 on hydrophobic peptide in oriented membranes, Middleton *et al.*, **147**, 366
 ^{15}N CSA tensor magnitude and orientation in molecular frame of uracil, Leppert, Heise, and Ramachandran, **145**, 307
 sideband patterns from rotor-encoded longitudinal magnetization in MAS recoupling experiments, De Paul *et al.*, **146**, 140
 universal REDOR dephasing curve, measurement of ^{13}C – ^2D dipolar couplings with, Gullion, **146**, 220
- Refocusing
 primary echo signal: zero dead time detection of electron spin echo envelope modulation, Astashkin and Raitsimring, **143**, 280
- Regularization
 two-dimensional filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
 UPEN: data spacing, T_2 data, systematic data errors, and diagnostics, Borgia, Brown, and Fantazzini, **147**, 273
- Regularized resolvent transform
 for high-resolution spectral estimation, Chen, Shaka, and Mandelshtam, **147**, 129
- Relaxation
 and chemical exchange, in NMR simulations, Cuperlovic *et al.*, **142**, 11
 ^{13}C and ^{15}N , derived spectral density maps, peptide internal motions on nanosecond time scale derived from direct fitting of, Mayo *et al.*, **146**, 188
 ^{13}C or ^{15}N data, determination of global τ_R of proteins using, Mispelter *et al.*, **143**, 229
 cross-correlated
 for measurement of angles between tensorial interactions, Reif *et al.*, **143**, 45
 rates, avoiding measurement errors, Carlomagno and Griesinger, **144**, 280
 and hydrogen bonding effects on ^{15}N and ^1H shielding tensors in nucleic acid base pairs, Czernek, Fiala, and Sklenář, **145**, 142
 induced artifacts, compensation for: clean TROSY, Schulte-Herbrüggen and Sørensen, **144**, 123
 intermolecular dipole–dipole, ^{129}Xe dissolved in water, Dimitrov, Reddy, and Leigh, **145**, 302
- NMR
 detection and quantification of rotational diffusion anisotropy from, Bayesian statistical method, Andrec *et al.*, **146**, 66
 globular proteins, prediction from atomic-level structures and hydrodynamic calculations: HYDRONMR, García de la Torre, Huertas, and Carrasco, **147**, 138
 in multipolar AMX systems under spin-locking conditions, Kaikkonen and Kowalewski, **146**, 297
 relationships between ^1H NMR relaxation data and technological parameters of meat, chemometrics, Brown *et al.*, **147**, 89
 spectral estimation, Naugler and Cushley, **145**, 209
 slow-motion theory of nuclear spin relaxation in paramagnetic low-symmetry complexes, generalization to high electron spin, Nilsson and Kowalewski, **146**, 345
 spins 3/2 in biological media, model for dynamics of, Hancu, van der Maarel, and Boada, **147**, 179
- Relaxation-induced dipolar exchange with recoupling (RIDER)
 MAS NMR method for determination of heteronuclear distances without irradiation of second spin, Saalwächter and Schmidt-Rohr, **145**, 161
- Relaxation interference
 iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
- Relaxation rates
 multiple-quantum, measurement: multiple-quantum J -resolved NMR spectroscopy, Liu and Zhang, **146**, 277
 ^{15}N , protein backbone, as tool for diagnosis of structure quality, de Alba and Tjandra, **144**, 367
- Relaxation times
 ^{23}Na in $\text{Na}_4\text{HTm}[\text{DOTP}]$, temperature effect, Shapiro *et al.*, **143**, 213
- Relaxometry
 rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- Remote tuning
 NMR probe circuits, Kodibagkar and Conradi, **144**, 53
- Residual water
 enhanced suppression, in “270” WET sequence, Zhang, Yang, and Gorenstein, **143**, 382

- Resonance assignment
¹³C, ¹⁵N-labeled RNA oligonucleotides, sensitivity-enhanced MQ-HCN-CCH-TOCSY and MQ-HCN-CCH-COSY pulse schemes for, Hu, Jiang, and Gosser, **145**, 147
methyl-containing side chains in ¹³C-labeled proteins, 3D HCCH₃-TOCSY for, Uhrin *et al.*, **142**, 288
unambiguous, ¹H/¹⁵N resonances of proteins in complexes in slow chemical exchange with free form, ¹⁵N NMR exchange experiments for, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
- Resonators
electronically tunable surface-coil-type, for L-band EPR spectroscopy, Hirata, Walczak, and Swartz, **142**, 159
parallel coil, for time-domain RF EPR imaging of biological objects, Devasahayam *et al.*, **142**, 168
- Restricted diffusion
measurements using oscillating gradient spin-echo sequence, Schachter *et al.*, **147**, 232
relaxation of nuclear magnetization in nonuniform magnetic field gradient and restricted geometry, Zielinski and Sen, **147**, 95
- RFDR spectroscopy
compound RFDR pulse sequences for magnetization transfer by homonuclear dipolar interaction under MAS, Fujiwara, Khandelwal, and Akutsu, **145**, 73
narrowband, spinning-frequency-dependent, Goobes, Boender, and Vega, **146**, 204
two-dimensional, α -spectrin SH3 domain, sample optimization and identification of signal patterns of amino acid side chains, Pauli *et al.*, **143**, 411
- Ribonucleotide binase
iterative fitting procedure for determination of longitudinal NMR cross-correlation rates, Wang, Kurochkin, and Zuiderweg, **144**, 175
- Ringing effects
composite pulse experiments designed to cancel, accurate intensities of broad NMR lines from, Hedin and Furó, **142**, 32
- RNA oligonucleotides
¹³C, ¹⁵N-labeled, sensitivity-enhanced MQ-HCN-CCH-TOCSY and MQ-HCN-CCH-COSY pulse schemes for, Hu, Jiang, and Gosser, **145**, 147
- Rotating-frame imaging
finite-difference approach for high-precision analysis of rotating-frame diffusion images, Woelk *et al.*, **145**, 276
and high-resolution NMR, toroid cavity detectors for, Momot *et al.*, **142**, 348
torus factor: relationship between RF field and radial position in toroid cavity probes, Woelk, **146**, 157
- Rotation
coherent cross polarization theory for spin- $\frac{1}{2}$ coupled to general object, Magusin and Veeman, **143**, 243
- Rotational correlation time
global, in proteins, determination using ¹³C or ¹⁵N relaxation data, Mispelner *et al.*, **143**, 229
- Rotational diffusion
anisotropy, detection and quantification from NMR relaxation data, Bayesian statistical method, Andrec *et al.*, **146**, 66
- Rotational-echo double resonance (*see* REDOR)
- Rotational motion
effects on spin-lattice relaxation measurements using first-harmonic out-of-phase absorption EPR signals, Livshits and Marsh, **145**, 84
- Rotational resonance
conditions of, double-quantum filtration under, Dusold and Sebald, **145**, 340
- Rotational resonance NMR
efficient double-quantum excitation in, Karlsson *et al.*, **145**, 95
spinning single crystal, coherence transfer signals in, Antzutkin and Levitt, **147**, 147
- Rotation artifacts
in burst imaging, Wheeler-Kingshott, Crémillieux, and Doran, **143**, 161
- Rotators
molecular, with C₃ symmetry, NMR spin echoes for, Sullivan and Kisvarsanyi, **145**, 18
- RRT
regularized resolvent transform for high-resolution spectral estimation, Chen, Shaka, and Mandelshtam, **147**, 129
- Rubber
one-dimensional imaging with palm-size probe, Prado, Blümich, and Schmitz, **144**, 200
- Rubredoxin
¹⁵N-¹H spectra: regularization of 2D filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
structure determination from dipolar couplings, resolving orientational ambiguities in, variation of molecular alignment as means of, Al-Hashimi *et al.*, **143**, 402

S

- Saccharides
isotopically labeled, ²H T₁ and quadrupolar coupling constants in, Bose-Basu *et al.*, **144**, 207
- Salt water
ice, pore structure and anisotropic self-diffusion in, NMR characterization, Menzel *et al.*, **143**, 376
- Sample restriction
in high-resolution solid-state NMR, using magnetic field gradients, Charmont *et al.*, **145**, 334
- Sand
quartz, saturated, ¹H NMR T₁, paramagnetic effects of iron(III) species, Bryar, Daughney, and Knight, **142**, 74
- Saturation transfer
multiple-site kinetic measurements, correcting for incomplete saturation and off-resonance effects, Kingsley and Monahan, **146**, 100
proton chemical exchange-dependent, class of MRI contrast agents based on, Ward, Aletras, and Balaban, **143**, 79
- ⁴⁵Sc
multiple-quantum cross polarization with 2D MQMAS NMR, Ashbrook and Wimperis, **147**, 238
- SCT-HMSQC-HA
for measurement of ³J_{HNH α couplings in ¹⁵N-labeled proteins, Aitio and Permi, **143**, 391}
- ⁷⁷Se
in 2,1,3-benzoselenadiazole, spectral analysis: spin-1/2 nucleus scalar coupled to quadrupolar nuclei, Bernatowicz *et al.*, **145**, 152
- Second moment
¹H NMR, imaging with ¹³C chemical-shift resolution, Nonaka, Matsui, and Inouye, **145**, 315
- S³ editing
techniques for measurement of C'N and C'H^N J-coupling constants across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 387
- Seed
intracellular glasses, pulsed EPR study, Buitink *et al.*, **142**, 364
- Segmental dynamics
pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
- SELDOM
initial conditions for ¹³C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, Tekely *et al.*, **145**, 173
- Selective deuteration
measurement of proton-proton coupling constants in DNA sugar ring, Yang *et al.*, **146**, 260

- Selective excitation
 extension of excitation sculpting concept to, Roumestand and Canet, **147**, 331
 improved Shinnar–Le Roux algorithm, Ikonomidou and Sergiadis, **143**, 30
 in-phase, of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389
 pulses, nonlinear phase adjustment of, Carlson, **147**, 210
- Selective inversion
 RF pulse concatenation for, Pruessmann *et al.*, **146**, 58
- Selective volume
 NMR in inhomogeneous magnetic fields, Bālibanu *et al.*, **145**, 246
- Self-diffusion
 anisotropic
 in nematic liquid crystal, electric field PFG NMR approach, Holstein *et al.*, **143**, 427
 in salt water ice, NMR characterization, Menzel *et al.*, **143**, 376
- Self-navigation
 in high-resolution diffusion imaging using radial turbo spin-echo sequence, Seifert *et al.*, **144**, 243
- Semi-constant-time experiment
 time-shared $X(\omega_1)$ -half-filter for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168
- Semi-constant-time HMQC
 for measurement of ${}^3J_{\text{HNH}\alpha}$ couplings in ${}^{15}\text{N}$ -labeled proteins, Aitio and Permi, **143**, 391
- Sensitivity
 in pulsed-field-gradient experiments, Lin *et al.*, **144**, 6
 subspectral editing, improvement, time-shared $X(\omega_1)$ -half-filter for, Andersson and Otting, **144**, 168
- Sensitivity enhancement
 heteronuclear active-coupling-pattern-tilting spectroscopy, Koźmiński and Nanz, **142**, 294
 MQ–HCN–CCH–TOCSY and MQ–HCN–CCH–COSY pulse schemes for ${}^{13}\text{C}$, ${}^{15}\text{N}$ -labeled RNA oligonucleotides, Hu, Jiang, and Gosser, **145**, 147
 population and coherence transfer induced by double-frequency sweeps in half-integer quadrupolar spin systems, Iuga *et al.*, **147**, 192
 by simultaneous acquisition of two coherence pathways: HNCA⁺ experiment, Salzmänn *et al.*, **143**, 223
 solid-state ${}^{15}\text{N}$ NMR, by indirect detection with high-speed MAS, Ishii and Tycko, **142**, 199
- Shaped pulses
 simultaneous soft pulses applied at nearby frequencies, Steffen, Vendersypen, and Chuang, **146**, 369
- Shinnar–Le Roux algorithm
 improved, Ikonomidou and Sergiadis, **143**, 30
- Shinnar–Le Roux pulses
 optimized slice-selective, transverse relaxation effects using, Raddi and Klose, **144**, 108
- Short mixing sequences
 broadband heteronuclear Hartmann–Hahn sequences, Luy and Glaser, **142**, 369
- Side-access probe
 dielectric resonator-based, for muscle fiber EPR study, Sienkiewicz *et al.*, **143**, 144
- Sidebands
 adiabatic decoupling
 analytical solution for amplitudes and phases as function of spin inversion time τ , Zhang and Gorenstein, **144**, 316
 cancellation: synchronized adiabatic decoupling, Zhang and Gorenstein, **147**, 110
- Sideband separation
 MAS exchange method using: PATROS, Reichert *et al.*, **146**, 311
- Side chains
 methyl-containing, in ${}^{13}\text{C}$ -labeled proteins, 3D HCCH₃-TOCSY for resonance assignment of, Uhrín *et al.*, **142**, 288
 in radical anions of ubiquinones, dynamics, ENDOR spectroscopic and molecular orbital study, Lehtovuori and Joela, **145**, 319
- Signal intensity
 radial and longitudinal effect in double TE₁₀₄ and single TE₁₀₂ rectangular cavity, Mazúr, Valko, and Morris, **142**, 37
- Signal loss
 during RF excitation in TQ-filtered sodium MRI: model for dynamics of spins 3/2 in biological media, Hancu, van der Maarel, and Boada, **147**, 179
- Signal-to-noise ratio
 ESEEM measurements with time-resolved detection of entire ESE signal shape, Astashkin, Kozlyuk, and Raitsimring, **145**, 357
 optimizing, and improved spectral editing for solids: sequence for obtaining ${}^{13}\text{CH} + {}^{13}\text{CH}_2$ -only ${}^{13}\text{C}$ spectra, Burns, Wu, and Zilm, **143**, 352
- Signs of phases
 in NMR: role of radiofrequency mixing, Levitt and Johannessen, **142**, 190
- Silica gel
 ${}^1\text{H}$ NMR T_1 , paramagnetic effects of iron(III) species, Bryar, Daughney, and Knight, **142**, 74
- Simulations
 calculation of cross polarization spectra influenced by slow molecular tumbling, Mayer, **145**, 216
 chemical exchange lineshapes in CP/MAS spectra using Floquet theory and sparse matrix methods, Hazendonk *et al.*, **146**, 33
 EPR spectral, of nitroxides, characterization of biological membranes, Štrancar, Šentjurc, and Schara, **142**, 254
 high-field EPR spectra of spin-labeled lipids in membranes, Livshits and Marsh, **147**, 59
 NMR experiments involving pulsed-field gradients, computer program: Virtual NMR Spectrometer, Nicholas *et al.*, **145**, 262
 numerical
 double-quantum filtration under rotational-resonance conditions, Dusold and Sebald, **145**, 340
 intermolecular multiple-quantum coherences: NMR and MRI, Garrett-Roe and Warren, **146**, 1
 random walk, effects of various types of molecular dynamics on 1D and 2D ${}^2\text{H}$ NMR, Vogel and Rössler, **147**, 43
 SIMPSON, general program for solid-state NMR spectroscopy, Bak, Rasmussen, and Nielsen, **147**, 296
 spectral, spin relaxation and chemical exchange in, Cuperlovic *et al.*, **142**, 11
- Simultaneous soft pulses
 applied at nearby frequencies, Steffen, Vendersypen, and Chuang, **146**, 369
- Single-crystal NMR
 coherence transfer signals in rotational resonance NMR of spinning single crystal, Antzutkin and Levitt, **147**, 147
 variable-temperature, small crystals and small coils in, Vosegaard *et al.*, **142**, 379
- Single-point imaging
 turbo-spin-echo, heterogeneous materials, Beyea *et al.*, **144**, 255
- Single-quantum coherence filter
 for strongly coupled spin systems for localized ${}^1\text{H}$ NMR spectroscopy, Trabesinger, Mueller, and Boesiger, **145**, 237
- Slow-motion theory
 nuclear spin relaxation in paramagnetic low-symmetry complexes, generalization to high electron spin, Nilsson and Kowalewski, **146**, 345
- Small tip-angle approximation
 k -space analysis of MR tagging, Kerwin and Prince, **142**, 313
- Sodium
 distribution in intact plants: ${}^{23}\text{Na}$ and ${}^1\text{H}$ NMR microimaging, Olt *et al.*, **144**, 297

- triple-quantum filtered sodium MRI in cartilage, signal loss during RF excitation: model for dynamics of spins 3/2, Hancu, van der Maarel, and Boada, **147**, 179
- Soft pulses
simultaneous, applied at nearby frequencies, Steffen, Vendersypen, and Chuang, **146**, 369
- Solid air
molecular oxygen in, multifrequency EPR spectra, Pardi *et al.*, **146**, 375
- Solids
diffusion in, ^{13}C PGSE NMR with heteronuclear dipolar decoupling, Dvinskikh, Sitnikov, and Furó, **142**, 102
improved broadband decoupling sequence for, Fung, Khitritin, and Ermolaev, **142**, 97
phonon-assisted spin diffusion in, Dolinšek, Cereghetti, and Kind, **146**, 335
spectral editing, improved: sequence for obtaining $^{13}\text{CH} + ^{13}\text{CH}_2$ -only ^{13}C spectra, Burns, Wu, and Zilm, **143**, 352
- Solid-state imaging
 ^1H NMR second moment, with ^{13}C chemical-shift resolution, Nonaka, Matsui, and Inouye, **145**, 315
- Solid-state NMR
atomic refinement using orientational restraints from, Bertram *et al.*, **147**, 9
chain dynamics in polymers and blends, WIM/WISE NMR studies, Qiu and Mirau, **142**, 183
general simulation program SIMPSON for, Bak, Rasmussen, and Nielsen, **147**, 296
high-order multiple-quantum evolution in, molecular geometry determination by, Edén *et al.*, **144**, 266
high-resolution
 ^{13}C 3D CSA-CSA-CSA correlation experiment based on magic angle turning, Hu *et al.*, **145**, 230
sample restriction using magnetic field gradients, Charmont *et al.*, **145**, 334
internuclear distances in, measurement by background-filtered REDOR experiment, Vogt *et al.*, **147**, 26
method for setting magic angle, Nagaraja and Ramanathan, **146**, 165
multidimensional dipolar exchange-assisted recoupling measurements in, Sachleben, Beverwyk, and Frydman, **144**, 330
- ^{15}N
imaging membrane protein helical wheels, Wang *et al.*, **144**, 162
sensitivity enhancement by indirect detection with high-speed MAS, Ishii and Tycko, **142**, 199
nonspinning, thermometer for, Beckmann and Dybowski, **146**, 379
powder deuterium NMR lineshapes, dip in, Westlund, **145**, 364
pure-exchange, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
 α -spectrin SH3 domain: sample optimization and identification of signal patterns of amino acid side chains in 2D RFDR spectra, Pauli *et al.*, **143**, 411
spin-3/2, multiple-time correlation functions in, Böhmer, **147**, 78
static multipulse, analysis of orientation-dependent ^{19}F dipolar couplings within trifluoromethyl group, Grage and Ulrich, **146**, 81
3D, resolution of resonances of in-plane residues in uniformly ^{15}N -labeled helical membrane proteins in oriented lipid bilayers, Marassi *et al.*, **144**, 156
- Solid-state NMR index
helical membrane protein structure and topology, Marassi and Opella, **144**, 150
- Solution NMR
nitrobenzene aligned by strong AC electric fields, dipolar interactions in, Peshkovsky and McDermott, **147**, 104
orientation of membrane protein in micelles for, by specific binding of lanthanide ions to added EF-hand, Ma and Opella, **146**, 381
- Solvent-induced isotope shift
 H_2^{18}O , in ^{19}F NMR, Arnold and Fisher, **142**, 1
- Sparse matrix methods
and Floquet theory, simulations of chemical exchange lineshapes in CP/MAS spectra using, Hazendonk *et al.*, **146**, 33
- Spectral analysis
in-phase selective excitation of overlapping multiplets, Harris, Lowe, and Norwood, **142**, 389
- Spectral density maps
 ^{13}C and ^{15}N NMR, peptide internal motions on nanosecond time scale derived from direct fitting of, Mayo *et al.*, **146**, 188
- Spectral editing
with double-quantum coherence transfer, off-resonance effects of RF pulses used in, Lei and Peeling, **144**, 89
modified, for ^{13}C CP/MAS experiments in solids, Hu *et al.*, **142**, 326
simultaneous, for γ -aminobutyric acid and taurine, using double quantum coherence transfer, Lei and Peeling, **143**, 95
in solids, improved: sequence for obtaining $^{13}\text{CH} + ^{13}\text{CH}_2$ -only ^{13}C spectra, Burns, Wu, and Zilm, **143**, 352
techniques for measurement of C'N and C'H^N *J*-coupling constants across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 387
- Spectral estimation
high-resolution, regularized resolvent transform for, Chen, Shaka, and Mandelshtam, **147**, 129
of NMR relaxation, Naugler and Cushley, **145**, 209
- Spectral simulation
spin relaxation and chemical exchange in, Cuperlovic *et al.*, **142**, 11
- Spectral window
for ultrawide band NMR spectroscopy, method to increase, Gan, **146**, 245
- α -Spectrin
SH3 domain, 2D RFDR spectra: sample optimization and identification of signal patterns of amino acid side chains, Pauli *et al.*, **143**, 411
- Spectroscopic imaging
volume selective detection by weighted averaging of constant tip angle scans, Serša and Macura, **143**, 208
- SPINAL-64
improved broadband decoupling sequence for liquid crystals and solids, Fung, Khitritin, and Ermolaev, **142**, 97
- Spin concentration
quantitation method by EPR, application to methemoglobin and metmyoglobin, Svistunenko *et al.*, **142**, 266
- Spin diffusion
in analysis of disaccharide conformation using modified GOESY, Dixon, Widmalm, and Bull, **147**, 266
initial conditions for ^{13}C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, Tekely *et al.*, **145**, 173
phonon-assisted, in solids, Dolinšek, Cereghetti, and Kind, **146**, 335
- Spin dynamics
approach to separating EPR lines arising from species with different EPR lines, Hofbauer and Bittl, **147**, 226
CPMG-like sequences in grossly inhomogeneous B_0 and B_1 fields, and application to NMR well logging, Hürlimann and Griffin, **143**, 120
PISEMA in multiple spin systems, Gan, **143**, 136
- Spin echoes
entire ESE signal shape, ESEEM measurements with time-resolved detection of, Astashkin, Kozlyuk, and Raitsimring, **145**, 357
for molecular rotators with C_3 symmetry, Sullivan and Kisvarsanyi, **145**, 18
nutation, and use for localized NMR, Ardelean, Kimmich, and Klemm, **146**, 43
- Spin labels
lipids with, in membranes, simulation studies of high-field EPR spectra, Livshits and Marsh, **147**, 59
 T_1 measurements using first-harmonic out-of-phase absorption EPR signals, rotational motion effects, Livshits and Marsh, **145**, 84

- Spin–lattice relaxation
¹³C, characterization of molecular motion in solid state by, Varner, Vold, and Hoatson, **142**, 229
 fluid protons in porous media, paramagnetic effects of iron(III) species, Bryar, Daughney, and Knight, **142**, 74
²H, and quadrupolar coupling constants, in isotopically labeled saccharides, Bose-Basu *et al.*, **144**, 207
¹H NMR, inhibitors interacting with *Torpedo californica* acetylcholinesterase, Delfini *et al.*, **144**, 129
 measurements using first-harmonic out-of-phase absorption EPR signals, rotational motion effects, Livshits and Marsh, **145**, 84
 rates, for high-spin Fe(III) complexes in glassy solvents at temperatures between 6 and 298 K, Zhou *et al.*, **144**, 115
 separation of quadrupolar and magnetic contributions, case of single isotope, Suter *et al.*, **143**, 266
 spin-lock adiabatic field cycling imaging study of low-frequency molecular dynamics, Anoardo, Hauser, and Kimmich, **142**, 372
 strongly coupled spins, cross correlations in, Dorai and Kumar, **145**, 8
 in system with chemical exchange, measurement with one-pulse experiment, Spencer and Fishbein, **142**, 120
 times, effects of off-resonance irradiation, cross relaxation, and chemical exchange, Kingsley and Monahan, **143**, 360
- Spin-lock adiabatic field cycling imaging
 low-frequency molecular dynamics studied by, Anoardo, Hauser, and Kimmich, **142**, 372
- Spin multiplicities
 approach to separating EPR lines arising from species with different EPR lines, Hofbauer and Bittl, **147**, 226
- Spinning
 magnetic-field-gradient, EPR imaging using, Ohno and Watanabe, **143**, 274
- Spinning frequency dependence
 narrowband RF-driven dipolar recoupling, Goobes, Boender, and Vega, **146**, 204
- Spinning-sideband patterns
 from rotor-encoded longitudinal magnetization in MAS recoupling experiments, De Paul *et al.*, **146**, 140
- Spin probe
 pulsed EPR study of intracellular glasses in seed and pollen, Buitink *et al.*, **142**, 364
- Spins
 dipolar coupled, spin $\frac{1}{2}$, analytical polarization and coherence transfer functions, Luy and Glaser, **142**, 280
 $S=7/2$, 2D COSY for, theory and application: ⁵⁹Co in tetrahedral cluster HFeCo₃(CO)₁₁PPh₂H, Kempgens *et al.*, **142**, 64
 spin- $\frac{1}{2}$ coupled to general object, coherent cross polarization theory for, Magusin and Veeman, **143**, 243
 spin-1/2 nucleus scalar coupled to quadrupolar nuclei: analysis of ⁷⁷Se spectra in 2,1,3-benzoselenadiazole, Bernatowicz *et al.*, **145**, 152
 spin-3/2 nuclei in biological media, relaxation dynamics model, Hancu, van der Maarel, and Boada, **147**, 179
 strongly coupled, longitudinal relaxation of, cross correlations in, Dorai and Kumar, **145**, 8
- Spin–spin coupling (*see J coupling*)
- Spin–spin relaxation
 data, extension of UPEN to, Borgia, Brown, and Fantazzini, **147**, 273
 distribution, stable reconstruction, Steinbrecher *et al.*, **146**, 321
 effects on transverse magnetization using RF pulses long compared to T_2 , Raddi and Klose, **144**, 108
 proteins with short T_2 , evaluation of cross-correlation effects and measurement of one-bond couplings, Kontaxis, Clore, and Bax, **143**, 184
 relationships between ¹H NMR relaxation data and technological parameters of meat, chemometrics, Brown *et al.*, **147**, 89
 tendon: *in vivo* anisotropy analysis by portable NMR scanner NMR-MOUSE, Haken and Blümich, **144**, 195
 unbiased estimates using rapid acquisition transverse relaxometric imaging, Does and Gore, **147**, 116
- Spin-state-selective coherence transfer
 clean TROSY: compensation for relaxation-induced artifacts, Schulte-Herbrüggen and Sørensen, **144**, 123
- Spin-state-selective filters
 protein backbone angle ψ determination with TROSY-based α/β -HN(CO)CA- J experiment, Permi, Kilpeläinen, and Annala, **146**, 255
- Spin systems
 AMX, multipolar, NMR relaxation under spin-locking conditions, Kaikkonen and Kowalewski, **146**, 297
¹³C, double-quantum filtration under rotational-resonance conditions, Dussold and Sebald, **145**, 340
 NMR, nonlinear identification by adaptive filtering, Asfour, Raouf, and Fournier, **145**, 37
 strongly coupled, for localized ¹H NMR spectroscopy, single-quantum coherence filter for, Trabesinger, Mueller, and Boesiger, **145**, 237
- Spoiled gradient echo MRI
 magnetization transfer in, quantitative interpretation, Sled and Pike, **145**, 24
- Spurious peak suppression
 in TROSY experiments, Kojima and Kainosho, **143**, 417
- Stable spectrum reconstruction
 T_2 distribution, Steinbrecher *et al.*, **146**, 321
- STAR operator
 incorporation in ² J ,³ J -HMBC, Krishnamurthy *et al.*, **146**, 232
- Steady-state magnetization
 effects of off-resonance irradiation, cross relaxation, and chemical exchange, Kingsley and Monahan, **143**, 360
- STEAM decoupling
¹⁷O-decoupled ¹H spectroscopy and imaging with surface coil, Charagundla *et al.*, **143**, 39
- Steric stabilization
 magnetically oriented lipid bilayers by pegylation, King, Parker, and Howard, **142**, 177
- Stimulated echo
 nonlinear, diffusion measurements using, Ardelean and Kimmich, **143**, 101
 pulsed gradient spin-echo NMR, cross-relaxation effects by bipolar and monopolar gradient pulses, Dvinskikh and Furó, **146**, 283
- Stimulated-echo methods
 convection compensating, improved, Sørland *et al.*, **142**, 323
¹⁷O-decoupled ¹H spectroscopy and imaging with surface coil: STEAM decoupling, Charagundla *et al.*, **143**, 39
- Stimulated echo spectroscopy
 multiple-time correlation functions in spin-3/2 solid-state NMR spectroscopy, Böhmer, **147**, 78
- Stray field imaging (STRAFI)
 calibration of stray field gradient by heteronuclear method and field profiling, Preston, Kinchesh, and Randall, **146**, 359
 diffusion-weighted imaging of bacterial colonies in STRAFI plane, Carlton, Halse, and Strange, **143**, 24
- Stripe-COSY
 measurement of proton–proton coupling constants in DNA sugar ring, Yang *et al.*, **146**, 260
- Strongly coupled spins
 for localized ¹H NMR spectroscopy, single-quantum coherence filter for, Trabesinger, Mueller, and Boesiger, **145**, 237
 longitudinal relaxation, cross correlations in, Dorai and Kumar, **145**, 8
- Structure determination
 helical membrane protein structure and topology, solid-state NMR index, Marassi and Opella, **144**, 150
 macromolecules, by NMR, direct refinement against ¹H–¹H dipolar couplings in, Tjandra, Marquardt, and Clore, **142**, 393
 in peptides, NH–NH vector correlation by solid-state NMR, Reif *et al.*, **145**, 132

- refinement of protein NMR structures against torsion angle potentials of mean force, problem sources and solutions, Kuszewski and Clore, **146**, 249
- Subspectral editing
improved sensitivity, time-shared $X(\omega_1)$ -half-filter for, Andersson and Otting, **144**, 168
- Sugar ring
DNA, measurement of proton-proton coupling constants in, Yang *et al.*, **146**, 260
- Sugars
evaluation of contrast agents for MRI based on proton chemical exchange-dependent saturation transfer, Ward, Aletras, and Balaban, **143**, 79
- Sum combination line
zero dead time detection of electron spin echo envelope modulation: refocused primary echo, Astashkin and Raitsimring, **143**, 280
- Supercritical fluids
ethylene, ^1H dynamic nuclear polarization at 1.4 T, Wind *et al.*, **143**, 233
- Suppression
adiabatic decoupling sidebands, Zhang and Gorenstein, **144**, 316
diagonal peak, 3D protein NMR TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}-^1\text{H}^{\text{N}}$ NOESY spectra with, Meissner and Sørensen, **142**, 195
diagonal-ridge, pure-exchange solid-state NMR, deAzevedo, Bonagamba, and Schmidt-Rohr, **142**, 86
dipolar field effects in high-resolution liquid NMR, MAS as tool for, Broekaert *et al.*, **145**, 259
eddy current magnetic field, improved convection compensating PFGSE and stimulated-echo methods for, Sørland *et al.*, **142**, 323
matrix line, zero dead time detection of electron spin echo envelope modulation: refocused primary echo, Astashkin and Raitsimring, **143**, 280
residual water, enhanced, in “270” WET sequence, Zhang, Yang, and Gorenstein, **143**, 382
spurious peaks in TROSY experiments, Kojima and Kainosho, **143**, 417
water peak, time-frequency vs time-scale approach, Antoine, Coron, and Dereppe, **144**, 189
- Surface coil
 ^{17}O -decoupled ^1H spectroscopy and imaging with, Charagundla *et al.*, **143**, 39
single, imaging with, using RF field gradient, Baril *et al.*, **146**, 223
- Surface-coil-type resonator
electronically tunable, for L-band EPR spectroscopy, Hirata, Walczak, and Swartz, **142**, 159
- Susceptibility artifacts
inhomogeneity-induced, reducing in functional MRI of human brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
- Symmetrical molecules
carbon-carbon spin coupling constants in, proton detection, Berger, **142**, 136
- Symmetry
as aid in geometry determination in ligand-protein complexes, Al-Hashimi, Bolon, and Prestegard, **142**, 153
- Synchronized adiabatic decoupling
development for use in indirectly detected dimension, Zhang and Gorenstein, **147**, 110
- Systematic data errors
in uniform penalty inversion of multiexponential decay data, Borgia, Brown, and Fantazzini, **147**, 273
- System identification
nonlinear, of NMR spin systems by adaptive filtering, Asfour, Raouf, and Fournier, **145**, 37
- T
- Tagging
MR, k -space analysis of, Kerwin and Prince, **142**, 313
- Taurine
and γ -aminobutyric acid, simultaneous spectral editing using double quantum coherence transfer, Lei and Peeling, **143**, 95
strongly coupled A_2B_2 spin systems, *in vivo* localized ^1H NMR, single-quantum coherence filter for, Trabesinger, Mueller, and Boesiger, **145**, 237
- Temperature-dependent chemical shift
 ^{23}Na in $\text{Na}_4\text{HTm}[\text{DOTP}]$, Shapiro *et al.*, **143**, 213
- Temperature mapping
 ^{23}Na in $\text{Na}_4\text{HTm}[\text{DOTP}]$, Shapiro *et al.*, **143**, 213
- Tendon
anisotropy in, *in vivo* analysis by portable NMR scanner NMR-MOUSE, Haken and Blümich, **144**, 195
dense tissues imaging using dipolar contrast, Grenier, Pascui, and Briguet, **147**, 353
tensile loading, changes in apparent diffusion coefficient caused by, Han *et al.*, **144**, 217
- Tensile loading
Achilles tendon, changes in apparent diffusion coefficient caused by, Han *et al.*, **144**, 217
- Tensorial interactions
angles between, cross-correlated relaxation for measurement of, Reif *et al.*, **143**, 45
- Tetrahedral cluster
 $\text{HFeCo}_3(\text{CO})_{11}\text{PPH}_2\text{H}$, ^{59}Co in, application of 2D COSY for $S=7/2$ spins, Kempgens *et al.*, **142**, 64
- Thermal convection currents
in NMR, flow profiles and implications for coherence pathway selection, Jerschow, **145**, 125
- Thermal decomposition
activity of thermally excited multiplet states in macerals separated from bituminous coal during, Więckowski *et al.*, **145**, 62
- Thermally excited multiplet states
in macerals separated from bituminous coal, Więckowski *et al.*, **145**, 62
- Thermometer
for nonspinning solid-state NMR spectroscopy, Beckmann and Dybowski, **146**, 379
- Thin section method
vs gradient compensation, for reducing inhomogeneity artifacts in fMRI of brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
- Three-dimensional chemical-shift imaging
 ^{13}C , in isolated infarcted rat heart, Weidensteiner *et al.*, **143**, 17
- Three-dimensional correlation experiment
high-resolution ^{13}C CSA-CSA-CSA, based on magic angle turning, Hu *et al.*, **145**, 230
- Three-dimensional electrophoretic NMR correlation spectroscopy
simultaneous COSY spectra of L-aspartic acid and 4,9-dioxo-1,12-dodecanediamine, He *et al.*, **147**, 361
- Three-dimensional NMR
HCCH₃-TOCSY, for resonance assignment of methyl-containing side chains in ^{13}C -labeled proteins, Uhrín *et al.*, **142**, 288
heteronuclear, ^{15}N exchange experiment for unambiguous assignment of $^1\text{H}^{\text{N}}/^{15}\text{N}$ resonances of bound proteins, Vialle-Printems, van Heijenoort, and Guittet, **142**, 276
MRI of coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290
solid-state, resolution of resonances of in-plane residues in uniformly ^{15}N -labeled helical membrane proteins in oriented lipid bilayers, Marassi *et al.*, **144**, 156
3D protein NMR TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}-^1\text{H}^{\text{N}}$ NOESY spectra with diagonal peak suppression, Meissner and Sørensen, **142**, 195
TROSY-type HCCH correlation experiments, diagonal peak suppression in, Meissner and Sørensen, **144**, 171

- Three-spin topologies
analysis and prediction of isotropic mixing magnetization transfer profiles in, Sahu, **147**, 121
- TILT (*see* Transfer insensitive labeling technique)
- Tilted rotating frame
of nuclear spins, magnetization evolution in, tunneling spectroscopy from, Damyanovich, Peternelj, and Pintar, **145**, 1
- Time domain
stable spectrum reconstruction of T_2 distribution, Steinbrecher *et al.*, **146**, 321
- Time-domain algorithm
for NMR spectral normalization, Romano, Santini, and Indovina, **146**, 89
- Time-domain EPR imaging
biological objects, parallel coil resonators for, Devasahayam *et al.*, **142**, 168
- Time-frequency analysis
versus time-scale analysis, in water peak suppression, Antoine, Coron, and Dereppe, **144**, 189
- Time-scale analysis
versus time-frequency analysis, in water peak suppression, Antoine, Coron, and Dereppe, **144**, 189
- Time signals
multidimensional, high-resolution spectral estimation, regularized resolvent transform for, Chen, Shaka, and Mandelshtam, **147**, 129
- T-MREV
in NH–NH vector correlation in peptides by solid-state NMR, Reif *et al.*, **145**, 132
- T_1 noise
in pulsed-field-gradient experiments, Lin *et al.*, **144**, 6
- TOCSY
analysis and prediction of isotropic mixing magnetization transfer profiles in three-spin topologies, Sahu, **147**, 121
application of multidimensional filter diagonalization method, Hu *et al.*, **144**, 357
- Topologies
helical membrane proteins, solid-state NMR index, Marassi and Opella, **144**, 150
three-spin, analysis and prediction of isotropic mixing magnetization transfer profiles in, Sahu, **147**, 121
- Toroid cavity detectors
radial position in, relationship to RF field: toroid factor, Woelk, **146**, 157
rotating-frame NMR images obtained with, finite-difference determination of diffusion coefficients from, Woelk *et al.*, **145**, 276
for simultaneous high-resolution NMR and rotating-frame imaging, Momot *et al.*, **142**, 348
- Torsion angle potentials of mean force
problems in refinement of protein NMR structures against, sources and solutions, Kuszewski and Clore, **146**, 249
- Torus factor
relationship between RF field and radial position in toroid cavity probes, Woelk, **146**, 157
- Transfer insensitive labeling technique
using concatenated inversion in, MT artifact suppression, Pruessmann *et al.*, **146**, 58
- Transition moments
different, approach to separating EPR lines arising from species with, Hofbauer and Bittl, **147**, 226
- Transport processes
microscopic displacement imaging with PFG turbo spin-echo NMR, Scheenen *et al.*, **142**, 207
- Transverse magnetization
using RF pulses long compared to T_2 , relaxation effects, Raddi and Klose, **144**, 108
- Transverse relaxation (*see* Spin–spin relaxation)
- Trifluoromethyl group
orientation-dependent ^{19}F dipolar couplings within, static multipulse solid-state NMR, Grage and Ulrich, **146**, 81
- TRIPLE
two-dimensional pulsed, at 95 GHz, Epel and Goldfarb, **146**, 196
- tRNA
internucleotide $^hJ_{\text{HN}}$ couplings, determination by modified 2D J_{NN} -correlated [^{15}N , ^1H] TROSY, Yan *et al.*, **147**, 357
- tr-ODESSA
with PASS: PATROS, Reichert *et al.*, **146**, 311
- Tropolone
 ^{13}C MAS NMR 1D exchange involving chemically equivalent and inequivalent nuclei, initial conditions for, Tekely *et al.*, **145**, 173
- TROSY
clean TROSY: compensation for relaxation-induced artifacts, Schulte-Herbrüggen and Sørensen, **144**, 123
 α/β -HN(CO)CA- J experiment based on, determination of backbone angle ψ in proteins, Permi, Kilpeläinen, and Annala, **146**, 255
and hydrogen bonding effects on ^{15}N and ^1H shielding tensors in nucleic acid base pairs, Czernek, Fiala, and Sklenář, **145**, 142
 J_{NN} -correlated [^{15}N , ^1H], modified 2D, determination of internucleotide $^hJ_{\text{HN}}$ couplings by, Yan *et al.*, **147**, 357
measurement of C'N and C'H $^{\text{N}}$ J -coupling constants across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 387
measurement of ^{3h}J coupling between C $^{\alpha}$ and H $^{\text{N}}$ across hydrogen bonds in proteins, Meissner and Sørensen, **143**, 431
measurement of $^3J_{\text{N,C}\gamma}$ and $^3J_{\text{C}\gamma,\text{C}\gamma}$ coupling constants of aromatic residues in ^{13}C , ^{15}N -labeled proteins, Löhner and Rüterjans, **146**, 126
protein dynamics measurements, Zhu *et al.*, **143**, 423
suppression of spurious peaks in, Kojima and Kainosho, **143**, 417
three-dimensional protein NMR TROSY-type ^{15}N -resolved $^1\text{H}^{\text{N}}\text{--}^1\text{H}^{\text{N}}$ NOESY spectra with diagonal peak suppression, Meissner and Sørensen, **142**, 195
- TROSY-type correlation
three-dimensional protein NMR HCCH experiments, diagonal peak suppression in, Meissner and Sørensen, **144**, 171
- Tuning
remote, NMR probe circuits, Kodibagkar and Conradi, **144**, 53
- Tunneling spectroscopy
from magnetization evolution in tilted rotating frame of nuclear spins, Damyanovich, Peternelj, and Pintar, **145**, 1
- Turbo spin-echo imaging
with PFG NMR, microscopic displacement imaging with, Scheenen *et al.*, **142**, 207
- Turbo spin-echo sequence
radial, high-resolution diffusion imaging using, Seifert *et al.*, **144**, 243
- Turbo spin-echo single-point imaging
heterogeneous materials, Beyea *et al.*, **144**, 255
- Two-dimensional filter diagonalization method
regularization: FDM2K, Chen, Mandelshtam, and Shaka, **146**, 363
- Two-dimensional MQMAS NMR
with multiple-quantum cross polarization, of quadrupolar nuclei, Ashbrook and Wimperis, **147**, 238
- Two-dimensional NMR
 ^2H , effects of various types of molecular dynamics, random walk simulations, Vogel and Rössler, **147**, 43
MRI of coronary arteries and heart valves in living mouse, Ruff *et al.*, **146**, 290
PFG, for encoding correlations of position, velocity, and acceleration in fluid transport, Han, Stapf, and Blümich, **146**, 169
regularization of 2D filter diagonalization method, Chen, Mandelshtam, and Shaka, **146**, 363
WIM/WISE NMR studies of chain dynamics in solid polymers and blends, Qiu and Mirau, **142**, 183

- Two-dimensional-selective RF excitation
 - gradient-echo line scan imaging using, Finsterbusch and Frahm, **147**, 17
- Two-dimensional spectroscopy
 - ENDOR-ESEEM correlation spectroscopy, Bar *et al.*, **145**, 115
- L-Tyrosine hydrochloride
 - application of improved broadband decoupling sequence with, Fung, Khitrin, and Ermolaev, **142**, 97

U

- Ubiquinones
 - dynamics of side chain in radical anions of, ENDOR spectroscopic and molecular orbital study, Lehtovuori and Joela, **145**, 319
- Ubiquitin
 - backbone angle ψ , determination with TROSY-based α/β -HN(CO)CA-*J* experiment, Permi, Kilpeläinen, and Annala, **146**, 255
 - NMR structure determination, direct refinement against ^1H - ^1H dipolar couplings in, Tjandra, Marquardt, and Clore, **142**, 393
- U-FLARE
 - ^1H spectroscopic, fast variant using adjusted chemical shift phase encoding, Ebel, Dreher, and Leibfritz, **142**, 241
- Ultrawide band multifrequency high-field EMR
 - methodology for increasing spectroscopic information, Hassan *et al.*, **142**, 300
- Ultrawide band NMR spectroscopy
 - method to increase the spectral window in, Gan, **146**, 245
- Uniform penalty inversion of multiexponential decay data (UPEN)
 - data spacing, T_2 data, systematic data errors, and diagnostics, Borgia, Brown, and Fantazzini, **147**, 273
- Uracil
 - ^{15}N CSA tensor magnitude and orientation in molecular frame of, determined via MAS NMR, Leppert, Heise, and Ramachandran, **145**, 307

V

- Variable-temperature experiments
 - single-crystal NMR, small crystals and small coils in, Vosegaard *et al.*, **142**, 379
- Vector correlation
 - NH-NH, in peptides by solid-state NMR, Reif *et al.*, **145**, 132
- Vector models
 - J*-coupled spin evolution in IS spin system during RF irradiation of one spin, comparison with quantum mechanical representations, Bendall and Skinner, **143**, 329
- Velocity
 - correlations with position and acceleration in fluid transport, 2D PFG NMR for encoding, Han, Stapf, and Blümich, **146**, 169
- Velocity autocorrelation
 - correlation time and diffusion coefficient imaging for granular flows, Caprihan and Seymour, **144**, 96
- Velocity compensation
 - and navigator echoes, reduction of motion artifacts in diffusion imaging using, Clark, Barker, and Tofts, **142**, 358
- Virtual NMR facility
 - development and use of, Keating *et al.*, **143**, 172
- Virtual NMR Spectrometer
 - computer program for simulation of NMR experiments with pulsed-field gradients, Nicholas *et al.*, **145**, 262
- Visual cortex
 - activation, test of method for reducing inhomogeneity artifacts in fMRI of brain activation, Merboldt, Finsterbusch, and Frahm, **145**, 184
- Voigt function
 - approximation of, analytical derivation, Bruce *et al.*, **142**, 57
- Volterra series
 - nonlinear identification of NMR spin systems by adaptive filtering, Asfour, Raoof, and Fournier, **145**, 37

- Volume selection
 - nutration spin echo and use for localized NMR, Ardelean, Kimmich, and Klemm, **146**, 43
- Volume selective detection
 - by weighted averaging of constant tip angle scans, Serša and Macura, **143**, 208

W

- Water
 - H_2^{18}O solvent-induced isotope shift in ^{19}F NMR, Arnold and Fisher, **142**, 1
 - protein hydration and location of water molecules in oxidized horse heart cytochrome *c*, Bertini *et al.*, **147**, 1
 - ^{129}Xe dissolved in, intermolecular dipole-dipole relaxation, Dimitrov, Reddy, and Leigh, **145**, 302
- Water diffusion
 - evidence of red cell alignment in magnetic field of spectrometer, Kuchel *et al.*, **145**, 291
- Water holding capacity
 - meat, correlation with ^1H NMR relaxation data, chemometric approach, Brown *et al.*, **147**, 89
- Water presaturation experiments
 - pulse shaping in, strange effects, Kupče and Freeman, **146**, 240
- Water-protein interactions
 - in oxidized horse heart cytochrome *c*, ^1H NMR study, Bertini *et al.*, **147**, 1
- Water suppression
 - in extension of excitation sculpting concept to selective excitation, Roumestand and Canet, **147**, 331
 - peak suppression, time-frequency vs time-scale approach, Antoine, Coron, and Dereppe, **144**, 189
- Water transport
 - role in changes in apparent diffusion coefficient caused by tensile loading of rabbit Achilles tendon, Han *et al.*, **144**, 217
- Wavelets
 - water peak suppression using, comparison with Gabor transform approach, Antoine, Coron, and Dereppe, **144**, 189
- Weighted averaging
 - constant tip angle scans, volume selective detection by, Serša and Macura, **143**, 208
- Well logging
 - NMR, application of spin dynamics of CPMG-like sequences in grossly inhomogeneous B_0 and B_1 fields, Hürlimann and Griffin, **143**, 120
- WET sequence
 - "270," enhanced suppression of residual water in, Zhang, Yang, and Gorenstein, **143**, 382
- Whispering gallery modes
 - dielectric resonators in, high-field multifrequency EPR spectroscopy using, Annino *et al.*, **143**, 88
- WIM/WISE NMR (windowless isotropic mixing/wideline separation NMR)
 - studies of chain dynamics in solid polymers and blends, Qiu and Mirau, **142**, 183

X

- ^{129}Xe
 - continuous-flow optical pumping NMR in closed circuit system, Kneller *et al.*, **147**, 261
 - dissolved in water, intermolecular dipole-dipole relaxation, Dimitrov, Reddy, and Leigh, **145**, 302
 - hyperpolarized, continuously flowing, chemical-shift imaging with, for characterization of materials, Moudrakovski *et al.*, **144**, 372
- $X(\omega_1)$ -half-filter
 - time-shared, for improved sensitivity in subspectral editing, Andersson and Otting, **144**, 168

Xylene

ortho and *meta*, and other benzenes, codissolved in nematic liquid crystals, spectral, orientational order, and structural parameters, Syvitski and Burnell, **144**, 58

Z

Zero field

anisotropic hyperfine transitions in, detection using field-cycling techniques, Sturm *et al.*, **142**, 139

Zero-field splitting

observation of multifrequency EPR spectra of molecular oxygen in solid air, Pardi *et al.*, **146**, 375
slow-motion theory in high-spin systems, Nilsson and Kowalewski, **146**, 345

Zero-quantum coherence

intermolecular, numerical studies: NMR and MRI, Garrett-Roe and Warren, **146**, 1