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Prospectus

1. FIELDS OF INTEREST

The fields of interest to the *Journal of Statistical Physics* and the range of subject matter within which it will accept reports of original research in the form of both papers and notes and will invite or accept review articles are delineated as follows:

1.1. Statistical Mechanics

(a) Papers dealing with the mathematical and physical foundations of statistical mechanics are invited. Thus, the *Journal* is interested in questions such as the origin of irreversibility, the nature of phase transitions, and the equivalence of time- and ensemble-averaging. It is also concerned with documenting the evolution of a suitable formalism for the statistical mechanics of nonequilibrium processes.

(b) Papers concerned with the application of statistical mechanics to specific *real* systems are invited. Thus, computations concerned with the thermodynamic and transport porperties of both classical and quantum substances will be published. This will include consideration of the properties of both stellar systems and plasmas. Papers are encouraged which both *develop* and *use new methods*, examples of which might be quasiparticle, collective methods, and scattering theory.

(c) Noise and fluctuation phenomena fall within the proper domain of the *Journal.* This category is defined sufficiently broadly to include both spectral lineshape theory and correlation effects.

(d) Authors of experimental work concerned with statistical mechanics are encouraged to submit papers. However, these experiments should deal with the foundations of statistical mechanics (third-law experiments, for example), rather than with the measurement of specific data (thermodynamic parameters, for example).

1.2. Kinetic Theory

(a) The *Journal* is interested in papers dealing with the application of kinetic theory (nonensemble approaches) to transport phenomena.

(b) Papers dealing with the relation between atomistic and continuum physics are of particular interest (especially in the rarified gas domain).

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(c) Papers dealing with the application of kinetic theory to neutron transport will be accepted, including such topics as Fermi age theory and neutron thermalization in reactors, as well as other engineering topics.

(d) Contributions in the field of chemical rate theory are invited. They should, however, deal with problems in which underlying statistical distributions are important. Thus, conventional papers dealing with the *mechanism* of specific chemical processes may not be accepted. Papers involving the kinetic treatment of biological processes will also be invited.

(e) Articles reporting work in the field of nucleation or in the kinetics of phase transformations will be accepted. Here again, such papers should be concerned more with general principles than with specific systems.

(f) Although the title of this classification contains the word "theory," experimental papers will be accepted, provided that they demonstrate general theoretical principles rather than report data on specific systems.

1.3. Stochastics

(a) The *Journal* invites workers concerned with the application of stochastics to chemical and physical problems (e.g., rates, polymers, Brownian motion, analysis of data, etc.) to submit articles.

(b) Papers dealing with the application of stochastics to engineering problems (e.g., turbulence, control theory and estimation, electromagnetic propagation, structural problems, and experimental design) are especially sought after.

(c) The *Journal* will report work on the application of stochastics to pattern recognition.

(d) Although the word "physics" appears in its name, the *Journal* is also concerned with the application of stochastics to urban problems (e.g., traffic control, waste disposal, and air pollution).

1.4. Information and Communication Theory

The *Journal* also serves as a forum for work in the field of information and communication theory, especially with those problems in which *physics* as well as mathematics plays an important role. These generally involve situations which balance energy expenditure and entropy production. Papers dealing with signal processing and pattern recognition are welcome.

1.5. Life Processes

The application of statistical methods, including statistical mechanics and stochastics, to life processes is defined as a valid interest of the *Journal.* This includes papers dealing, for example, with cooperative phenomena in cell processes, fluctuation phenomena in living organisms, and the application of statistics and information theory to models of genetic mechanisms.

1.6. Mathematical Methods

Under this heading, we include all new mathematical methods of particular interest to the subjects listed above, including numerical methods. In other words, the *Journal* provides a forum or a dialogue between mathematics and all of statistical physics.

1.7. Economic Theory and Econometrics

The editors of the *Journal* welcome papers in the fields of economic theory and econometrics that, because of an affinity of concepts, methods, or types of models, would be of potential value to other readers of the *Journal.* Examples would include papers on the economics of information, resource allocation in a stochastic environment, applications of stochastic processes to economics, and algorithms for stochastic optimization. Another example is the measure-theoretic approach to equilibrium analysis, where an economy is described by a measure (distribution) on a space of characteristics (preferences, initial endowments) of the participants.

The editors wish to encourage as much dialogue as may be beneficial among physical and biological scientists, mathematicians, and social scientists. Editorial criteria for papers of an economic or social character will reflect that objective.

2. PHILOSOPHY AND OBJECTIVES

As is evidenced from the above, the *Journal,* besides providing a place for the publication of papers in the field of statistical physics, is particularly interested in establishing dialogues among the disciplines represented by chemists, physicists, engineers, mathematicians, biologists, and econometricians. To accomplish this, it will publish not only research and review papers *within* each of these disciplines, but also articles which address themselves specifically to interfaces *between* disciplines, and, in particular, to the transfer of techniques from one discipline to another. Examples of such interdisciplinary subjects might be the following:

(1) The application of techniques developed in connection with the many-body theory for coupled systems to problems of correlation in coding problems which arise in communication theory.

(2) The possible relationship between questions of irreversibility in statistical mechanics and problems of controllability and observability in control theory.

(3) The application of techniques being developed for random fluid-flow problems to nonlinear random problems of a more general nature. The editors hope to establish this interdisciplinary tradition at the outset by inviting specific individuals to submit review articles along these lines to the early issues of the *Journal.*

Four kinds of review articles are invited: (1) *Conventional reviews for the specialist:* critical, thorough, and designed to be of service to either the technical specialist in the field or to individuals bent upon becoming specialists. (2) *Current reviews:* up to date, brief, and informal, designed for the specialist, but perhaps less intent on criticism

and more upon reporting than the conventional review. (3) *Summaries of group activities:* brief resumes of the activities of certain well-defined research groups (written, of course, by a single member of the group). They are intended to acquaint the reader with the current and *future* interests of particular groups, so that certain worthwhile collaboration and exchanges of information may be stimulated. (4) *Pedagogical reviews:* for the nonexpert who wishes to maintain a familiarity with fields in which he is not working, but in which he has a peripheral interest. They may be consulted by an individual just entering a field.

The editors intend to have all reviews conform to a strict format. For example, the author is asked to begin the review by defining its nature in terms of the four categories just listed. In addition, he is asked to estimate its complexity and the ease with which it can be understood by both specialists and nonspecialists. Furthermore, he is requested to make every effort to arrange the text in such a manner that readers not interested in digesting the entire article can pass to the section of special interest immediately and find it intelligible in isolation. The author is also asked to instruct the reader, interested in this or that section, concerning which passages can be omitted.

The *Journal* also sponsors a question and answer department. This consists of a printed forum which allows individuals to advertise problems, sometimes of a philosophical and foundational nature, which are bothering them, and for which they have not been able to discover a satisfactory answer. Paradoxes, methods of pedagogical exposition, and many other subjects which so frequently engage the the attention of statistical physicists can be advertised in the form of brief communications and letters. Such notes need not even represent a partial research paper. In this form, scientists can actually advertise for help (or at least sympathy) in dealing with vexing conceptual matters.

There is a news department which assists with the planning and organization of meetings, seminars, and symposia, and features announcements concerning get-togethers of a very informal nature.

The *Journal* is extremely fastidious in avoiding the publication of papers which do not represent solid contributions. Long papers which represent little more than exercises in notational rearrangement will not be accepted. Papers which deal with such idealized systems that they constitute little more than the examination of mathematical games will be examined very carefully. One cannot invoke a blanket exclusion of these because, occasionally, they demonstrate important conceptual principles. Onsager's treatment of the two-dimensional Ising model, for example, is a case in point. If enough high-quality papers are not forthcoming, there will be a reduction of the number of *Journal* issues published annually rather than a lowering of standards. A distinguished Board of Editors will assure that such standards are maintained.

3. MECHANICS OF PUBLICATION

The *Journal* will publish papers describing original research and selected reviews. In addition, it will accept correspondence in the following departments:

(1) Nonscientific Communications[1] (not to exceed 500 words); (2) News (meetings, appointments, etc.); (3) Questions and Answers; (4) Book Reviews.

Papers describing the results of original research, as well as correspondence with regard to the four departments listed above, should be sent directly to the office of the Editor-in-Chief for processing. The Board of Editors is empowered to process manuscripts received from the Editor's office, which includes accepting them for publication. A Board member may elect to referee an article himself, may ask another Board member to perform the review, or may select a qualified referee who is not a member of the Board. He will, of course, be a specialist in the field in question. Upon submitting a paper to the *Journal*, the author may suggest an Editor who may be best qualified to process the paper. One of the reasons for this arrangement is to assure rapid processing and publication of qualified material.

Besides providing for more rapid publication, such decentralized operation involving the entire Board of Editors seems to be the only method for coping with the broad interdisciplinary scope of the *Journal*, assuring its quality.

Review articles, in general, are published by prior arrangement, either by invitation to a prospective author or through an affirmative response from the Editor and Board to a suggestion from an author. In all cases, the entire Board, or a suitably defined quorum thereof, will pass judgment on the suitability of a particular review article. The *Journal* does not wish to compete with, and therefore weaken, established review series; and care will be taken to assure that articles which should appear in such established vehicles are directed to them.

The style of the manuscripts, in general, should follow the recommendations of the American Institute of Physics in its *Style Manual.* In addition, a list of "indexing terms" (key words and phrases that play an important part) and "descriptors" (which may not have appeared, but are important in characterizing the paper) should appear below each abstract, but before the paper proper. For example, with a paper bearing the title "Sum Rules and Calculation of Transport Coefficients," the key words and phrases might be "sum rules, diffusion, momentum autocorrelation, spectral moments, transport theory, diffusion coefficient, viscosity, momentum flux." Such key words are being used by several journals already and will be included in the information on the American Institute of Physics magnetic tapes of document records. The key words are to be suggested by the author and approved by both the Editor and referee.

With the new title and citation indexes (especially the Science Citation Index, SCI), both titles and references should be carefully chosen; and the author should be responsible for a conscientious search which includes a knowledge of recent articles which cite the references he cites. These may be found directly using SCI.

H. Reiss
Editor-in-Chief

[1] This category includes such topics as form and arrangement of scientific meetings, critiques of modes of research, suggestions for the improvement of university curricula, queries about historical material, etc., all pertaining to the interests of workers in statistical physics.

BOARD OF EDITORS

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Name	Fields of interest
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Name	Fields of interest
Professor Kurt E. Shuler Department of Chemistry, University of California, San Diego, P.O. Box 109, La Jolla, Calif. 92038	Stochastics, chemical kinetics, relaxation processes
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