

Confirmation of the Existence of Modulation Wave Motion in Incommensurate Rb_2ZnCl_4 by Hahn Echo and 2D NMR

Ligia Muntean, Ursa Mikac^a, R. K. Subramanian^b, and David C. Ailion^c

JILA, Campus Box 440, University of Colorado, Boulder, CO 80309, USA

^a J. Stefan Institute, Ljubljana, Slovenia

^b Microcosm Inc., 4130 Guilford Road, Suite O, Columbia, MD 21046, USA

^c Dept. of Physics, University of Utah, 115 South 1400 East, Salt Lake City, Utah 84112, USA

Reprint requests to Prof. D. C. A.; Email: ailion@physics.utah.edu

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^{87}Rb Hahn echo nuclear magnetic resonance (NMR) and ^{35}Cl Hahn echo nuclear quadrupole resonance (NQR) measurements were performed at 293 - 302 K in the incommensurate (I) phase of Rb_2ZnCl_4 . The existence of a Hahn echo decay that is shorter than the true T_2 and one that has an exponential dependence on the cube of the echo time indicates the presence of slow motions. The diffusion coefficient D can be obtained from the rate of decay of the Hahn echo. Similar values for D were obtained from the two different measurements, indicating that both the Rb and the Cl atoms are experiencing the same motional mechanism. This mechanism must be due to simultaneous motions of each and can not be due to individual motions of only one type of atom. Further confirmation of the presence of modulation wave motion was obtained from ^{87}Rb two-dimensional (2D) exchange-difference NMR measurements.

Key words: Incommensurate; Modulation Wave; Hahn Echo; 2D Exchange NMR.