2002 Vol.38 No.3 pp.292-296 DOI:

BCS Ground State and XXZ Antiferromagnetic Model as SU(2), SU(1,1) Coherent States: An Algebraic Diagonalization Method

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(Received: 2002-2-24; Revised:)

Abstract: An algebraic diagonalization method is proposed. As two examples, the Hamiltonians of BCS ground state under mean-field approximation and XXZ antiferromagnetic model in linear spin-wave frame have been diagonalized by using SU(2), SU(1,1) Lie algebraic method, respectively. Meanwhile, the eigenstates of the above two models are revealed to be SU(2), SU (1,1) coherent states, respectively. The relation between the usual Bogoliubov-Valatin transformation and the algebraic method in a special case is also discussed.

PACS: 03.65.Fd, 02.20.-a

Key words: algebraic diagonalization method, coherent state

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