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Excitation Spectrum of Spin-1 Bosonic Atoms in an Optical Lattice with High Filling Factors

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Abstract: The Green's function and the higher-order correlation functions of spin-1 cold atoms in an optical lattice are defined. Because we consider the problem of spin-1 Bose condensed atoms in an optical lattice with high filling factors, i.e., the number density of Bose condensed atoms n_0 is large, the fluctuation of them can be neglected and we take mean-field approximation for the higher-order terms. The excitation spectra for both the polar case and the ferromagnetic case are obtained and analyzed.

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Key words: excitation spectrum, optical lattices, spinor atoms

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