Abstract Submitted
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Spin Phases of Strongly Interacting Two-Component Bose–Hubbard Model[1] SAGARIKA BASAK, HAN PU, Rice University — We study one-dimensional strongly interacting two-component bosons in an optical lattice with inter-component conversion using Schrieffer–Wolff transformation and spin-wave expansion towards obtaining spin phases in the deep Mott regime. Such a system can be experimentally realized by considering the two component bosons to be the two internal states of an atom. Previous work studying two-component Bose–Hubbard model in deep Mott region with inter-particle interaction (Phys. Rev. A **92**, 041602(R), 2015) shows Mott, x-y ferromagnetic, and disordered spin phases. The present consideration of inter-component conversion in the deep Mott regime shows the presence of such spin phases with additional parameters and the possibility of new spin phases. Restriction to only on-site conversion and constraining the two bosons (same internal state) to be converted simultaneously, we obtain anti-ferromagnetic symmetry in contrast to x-y ferromagnetic symmetry. The inter-component conversion also lowers the variational energy and shows different phases in the mean field. This provides an additional and an easier tool to tweak this system to obtain different spin phases.

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