

Abstract Submitted
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Ultracold Realization of AntiFerromagnetic Order¹ UTTAM SHRESTHA, University of California, Irvine — We investigate numerically the experimental feasibility of observing the antiferromagnetic (AF) order in the bosonic mixtures of rubidium (⁸⁷Rb) and potassium (⁴¹K) in a two-dimensional optical lattice with external trapping potential. Within the mean-field approximation we have found the ground states which, for a specific range of parameters such as inter-species interactions and lattice height, interpolate from phase separation to the AF order. For the moderate lattice heights the coexistence of the Mott and AF phase is possible for rubidium atoms while the potassium atoms remain superfluid with overlapped AF phase. In our view there has not been any study on AF order in two-component systems when one component remains in the superfluid phase while the other is in the Mott phase. Therefore, this observation may provide a novel regime for studying quantum magnetism in ultracold systems.

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