

The influence of the three-particle interaction on critical phenomena of the Bose-Hubbard Model

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The critical behavior of a mixture of two types of ultracold bosons on the optical lattice was studied. The system can be described by the Bose-Hubbard model. It is known that the system can be in a superfluid or in a Mott insulator state, depending on the hopping parameter and chemical potential. The interaction between different types of particles drastically changes the phase diagram. In particular, the transitions between mixed and superfluid states appear. The presence of a three-particle interaction leads to an increase in the Mott insulator region of the phase diagram. In particular, bosons with a higher hopping value can be still in the Mott insulator phase. The results are obtained in the framework of the mean-field approximation for a wide range of parameters.

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