

Abstract Submitted
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Quantum phases of mixtures of atoms and molecules on optical lattices¹ VALY ROUSSEAU, PETER DENTENEER, Instituut-Lorentz — We investigate the phase diagram of a two-species Bose-Hubbard model with an additional conversion term, where two particles from the first species can be converted into one particle of the second species, and vice-versa. The model can be related to ultra-cold atoms experiments where Feshbach resonance, used to tune the scattering length, produces long-lived bound states viewed as diatomic molecules. The model is solved exactly by means of Quantum Monte Carlo simulations. We find that the model exhibits an exotic incompressible “Super-Mott” phase where the particles from both species can flow with signs of superfluidity, but with anti-correlations such that there is no global supercurrent.

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