

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Supersolidity in a commensurate mixture of one-dimensional hardcore bosons with mass imbalance TASSILO KEILMANN, Max-Planck-Institut für Quantenoptik, JUAN IGNACIO CIRAC, TOMMASO ROSCILDE — We report on numerical simulations of an attractive mixture of mass-imbalanced hardcore bosons in a one-dimensional optical lattice. At a commensurate filling with 2-to-1 filling ratio we observe the formation of a crystal of *trimers* (made of two heavy and one light particle) which shows quasi-condensation and superfluidity for *both* particle species - hence a two-species supersolid. Supersolidity is observed both in the ground state of the system, as well as out of equilibrium in the stationary state that the system attains in the Hamiltonian evolution, after having being prepared into trimers by a superlattice. These two situations correspond to two different preparation protocols (simple adiabatic loading into an optical lattice, and release from a superlattice) which can both lead to the observation of supersolidity in optical lattice experiments.

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Date submitted: 07 Dec 2008

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