

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Sorting Category: 6.3 (T)

Charge density waves and off-diagonal order in the 1D Bose-Fermi-Hubbard model for fast fermions ALEXANDER MERING, MICHAEL FLEISCHHAUER, Technical University of Kaiserslautern, Germany — We discuss the Bose-Fermi-Hubbard model in 1D in the limit of fast (light) fermions. In this case, the fermions act as virtual quanta giving rise to an effective long-range interaction for the bosons, favouring a charge density wave (CDW) at $q = 1/\rho_F$ at small bosonic hopping. We derive an effective theory predicting accurately the CDW amplitude if the mean-field backaction of the bosons is included in the free dynamics of the fermions. The analytic predictions are compared to numerical DMRG results giving evidence that a finite CDW is associated with exponentially decaying bosonic correlations thus questioning the existence of a supersolid phase.

Prefer Oral Session
 Prefer Poster Session

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Date submitted: 01 Feb 2008

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