

Abstract Submitted  
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**Fermi-Bose mixtures in optical lattices: a new strongly correlated system** SILKE OSPELKAUS-SCHWARZER, CHRISTIAN OSPELKAUS, KAI BONGS, KLAUS SENGSTOCK, Institut fuer Laserphysik, University of Hamburg — Quantum degenerate mixtures of fermionic and bosonic atoms represent a new class of systems offering mixed statistics and intriguing interaction features, ranging from mean-field collapse effects to strongly correlated phases with Fermion-Boson pairs forming composite Fermions. We present experimental investigations on Fermi-Bose interactions in mixtures of  $^{40}\text{K}$  and  $^{87}\text{Rb}$  atoms in harmonic trapping potentials as well as in a 3D optical lattice. In particular we discuss the first experimental observation of a localized phase of the mixture in a 3D optical lattice. This phenomenon becomes evident in the reversible loss of visibility in the interference pattern of the bosonic component, which already takes place for a shallower lattice than needed to reach the Mott insulating phase of a comparable pure bosonic system. These measurements introduce a new system to the area of strongly correlated physics and potentially connect to polaron and disorder physics.

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