

Abstract Submitted
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Many body effects in a widely tunable Bose-Fermi mixture¹
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MARTIN ZWIERLEIN, Massachusetts Institute of Technology — A Bose-Einstein
condensate immersed in the Fermi sea provides a rich platform for the study of many
body effects such as polaron physics, boson-induced superfluidity and models of high-
tc superconductivity. Few bosonic impurities in a Fermi sea form bosonic polarons,
dressed quasi-particles that can condense, while few fermionic impurities in a Bose
condensate might dress into heavy fermions with an immense increase of the effective
mass. In an atom trap, both extremes of boson-fermion imbalance can in principle
be realized in one and the same sample. Recently we have realized a Bose Einstein
condensate of ⁴¹K immersed in a Fermi sea of ⁴⁰K at $T/T_F=0.3$ and detected a wide
Feshbach resonance between them. The mixture's lifetime is long enough so that
bosonic polarons should form at an expected binding energy of about $0.6 T_F$. In
this talk I will summarize our observations and the progress we have made to detect
polaron physics in Bose-Fermi mixtures.

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