

Abstract Submitted
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Polarons in a strongly interacting Bose-Fermi mixture¹ CHENG-HSUN WU, IBON SANTIAGO, JEE WOO PARK, PEYMAN AHMADI, SEBASTIAN WILL, MARTIN ZWIERLEIN, Massachusetts Institute of Technology — The fate of an impurity interacting with its environment is a fundamental problem in condensed matter physics. The famous example is that of an electron moving in the crystal background of ions, dressing itself with lattice distortions, phonons. In ultracold atomic systems, impurities interacting with a Fermi sea have been studied, leading to the observation of Fermi polarons. Here we study the interaction of an impurity immersed in a Bose-Einstein condensate of ^{23}Na . We perform radio-frequency spectroscopy on the impurity atom and the bath, which is expected to probe the spectral features characteristic for polaronic dressing: A delta-like peak in addition to a broad pedestal coming from the interactions between the impurity and the phonons in the condensate. A mixture of ^{23}Na and ^{40}K with its widely tunable interactions promises to be an ideal system to study the evolution from Bose polarons to Fermi polarons as the imbalance between ^{23}Na and ^{40}K is varied.

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