

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

A heavy impurity immersed in a Bose-Einstein Condensate ZOE YAN, YIQI NI, CARSTEN ROBENS, MARTIN ZWIERLEIN, Massachusetts Institute of Technology — We report on the creation and study of Bose polarons using degenerate fermionic 40K atoms immersed in a Bose-Einstein condensate (BEC) of 23Na . We observe the formation of the quasiparticles and measure their energy landscape via radio-frequency ejection spectroscopy. Besides measuring static properties such as polaron energy, we study collective oscillations between the majority BEC atoms and the impurities, demonstrating a strong locking of the two species' motion when their interaction strengths approach the unitary limit. Such measurements of polaron properties will inform work on a wide range of quantum phenomena, including high- T_c superconductivity and superfluid helium mixtures.

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Date submitted: 26 Jan 2018

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