Polarons in Fermi-Fermi and Fermi-Bose mixtures

*Sunday, 10 September 2023 22:40 (20 minutes)*

We report on recent breakthroughs in two experiments employing Feshbach-resonant mixtures of fermions. In radio-frequency spectroscopic measurements on fermionic $^{40}$K (or bosonic $^{41}$K) atoms immersed as impurities in a Fermi sea of $^6$Li atoms, we observed mediated polaron-polaron interactions [1]. Our results confirm the prediction of Fermi-liquid theory that the sign of this interaction depends on the impurity quantum statistics.

In experiments on a fermion mixture of $^{161}$Dy and $^{40}$K we demonstrate the formation of bosonic DyK Feshbach molecules and the preparation of a pure molecular sample in an optical dipole trap [1]. With a high phase-space density close to unity, we are approaching conditions of molecular Bose-Einstein condensation.


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