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Polarons in Fermi-Fermi and Fermi-Bose mixtures

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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.

[1] Baroni et al., arXiv:2305.04915.
[2] Soave et al., arXiv:2304.07921.

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