

Abstract Submitted
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Deeply degenerate Fermi-Fermi mixture of dysprosium and potassium atoms¹ CORNELIS RAVENSBERGEN, VINCENT CORRE, University of Innsbruck, IQOQI Innsbruck, ELISA SOAVE, MARIAN KREYER, EMIL KIRILOV, University of Innsbruck, RUDOLF GRIMM, University of Innsbruck, IQOQI Innsbruck — We report on the first realization of a mixture of fermionic ^{161}Dy and fermionic ^{40}K where both species are deep in the quantum-degenerate regime [1]. Both components are spin polarized in their absolute ground states, and the low temperatures are achieved by means of evaporative cooling of the dipolar dysprosium atoms together with sympathetic cooling of the potassium atoms. We describe the trapping and cooling methods, in particular the final evaporation stage, which leads to Fermi degeneracy of both species. By analyzing the cross-species thermalization we obtain an estimate of the magnitude of the inter species s -wave scattering length at low magnetic field. We have also carried our first Feshbach scans. The preliminary results show three magnetic field regions with very fast thermalization, which we associate with broad inter-species Feshbach resonances. The ^{161}Dy - ^{40}K system therefore features all ingredients needed to realize a strongly interacting mass-imbalanced fermion mixture.

[1] C. Ravensbergen et al. Phys. Rev. A. **98**, 063624 (2018).

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