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Dual-species MOT for fermionic dysprosium and potassium atoms VINCENT CORRE, CORNELIS RAVENSBERGEN, SLAVA TZANOVA, ELISA SOAVE, MARIAN KREYER, ALEXANDER WERLBERGER, EMIL KIRILOV, RUDOLF GRIMM, Institute for Quantum Optics and Quantum Information, Austrian Academy of Science, and Institute for Experimental Physics, University of Innsbruck — We report on the first realization of a dual-species magneto-optical trap that combines strongly magnetic lanthanide atoms (dysprosium) with alkali atoms (potassium). Advanced cooling techniques (gray molasses and narrow-line cooling) give us favorable starting conditions for evaporative cooling in an optical dipole trap which, by combining universal dipolar scattering and sympathetic cooling, should allow us to bring polarized samples of both species into the degenerate regime. With naturally abundant fermionic and bosonic isotopes of both dysprosium and potassium, this system provides a versatile platform to study degenerate mixtures. We are particularly interested in Fermi-Fermi mixtures, in which the mass imbalance is expected to give rise to novel pairing mechanisms and exotic quantum phases.

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