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New apparatus for the production of Fermi-Fermi mixtures of Dy and K MARIAN KREYER, CORNELIS RAVENSBERGEN, SLAVA TZANOVA, ELISA SOAVE, ALEXANDER WERLBERGER, VINCENT CORRE, EMIL KIRILOV, RUDOLF GRIMM, Institute for Quantum Optics and Quantum Information, Austrian Academy of Science, and Institute for Experimental Physics, University of Innsbruck — We have developed a new apparatus for the production of Fermi-Fermi mixtures of dysprosium and potassium. An atomic beam of dysprosium is produced in a high-temperature effusion oven and decelerated with a Zeeman slower. The atoms are then trapped by a narrow-line magneto-optical trap (MOT) operating on the 626 nm intercombination transition. Potassium atoms are first trapped with a $2D^+$ MOT, which produces a beam of slow atoms, and then transferred to the 3D MOT in the main chamber. We have so far achieved MOTs of bosonic ^{39}K and ^{164}Dy , and fermionic ^{40}K and ^{161}Dy , as well as the first double MOT of Dy and K. Our laser systems are based on infrared fiber lasers, which provide Dy light via sum frequency generation and K light via frequency-doubling, respectively. This brings the advantages of high stability, narrow linewidths and high beam quality, as well as the possibility to supply repumping light for potassium via sideband modulation. Further laser systems will enable narrow-line cooling for Dy as well as gray-molasses cooling for K.

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