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Simultaneous Optical Trapping of Lithium and Ytterbium Atoms
ANDERS HANSEN, ALEXANDER KHRAMOV, WILLIAM DOWD, VLADYSLAV IVANOV, SUBHADEEP GUPTA, University of Washington — Simultaneous trapping of different atomic species forms the starting point for experiments probing strong interactions and aspects of superfluidity in mass-imbalanced ultracold mixtures, as well as the synthesis of dipolar molecules through interspecies scattering resonances. Our choice of lithium (Li) and ytterbium (Yb) atoms as the two constituent species is based on several reasons. Both Li and Yb possess stable bosonic and fermionic isotopes which have previously been brought to quantum degeneracy in separate single-species experiments. Li is a one-electron atom and Yb is a two-electron atom, allowing species-selective trapping techniques using external magnetic fields are realizable, magnetic trapping of diatomic molecules of LiYb, and a large electric dipole moment in the molecular ground state allowing for studies of strongly dipolar gases. Ultracold polar LiYb is also a promising candidate for a sensitive electron EDM measurement. We have achieved simultaneous magneto-optical trapping of lithium and ytterbium atoms by loading from Zeeman slowed atomic beams from two separate beamlines. We will report on our experimental setup and latest experiments on trapping and cooling of both species in a far off resonance optical trap.

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