

Bose-Einstein Condensation of Erbium

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We report on the production of the first Bose-Einstein condensate of erbium [1]. Erbium is a very special multi-valence-electron atom, belonging to the lanthanide series. It possesses a strongly magnetic dipolar character, a rich energy level diagram, and various isotopes, among which one has a fermionic nature. Despite the complex atomic properties of such unconventional species, we find a surprisingly simple and efficient approach to reach quantum degeneracy by means of laser cooling on a narrow-line transition and standard evaporative cooling techniques. We observe favorable scattering properties of ^{168}Er , resulting in remarkably high evaporation efficiency and in a large number of Feshbach resonances at very low magnetic field values (around 1 G). All these desirable properties make Er a dream system for ultracold quantum gas experiments.

[1] K. Aikawa, A. Frisch, M. Mark, S. Baier, A. Rietzler, R. Grimm, and F. Ferlaino, *Bose-Einstein Condensation of Erbium*, Phys. Rev. Lett. **108**, 210401 (2012).