

An optical dipole trap for a two-species quantum degenerate gas of Li and Cs

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Abstract

The ability to precisely control the interactions of a Bose-Fermi mixture of ^{133}Cs and ^6Li at phase-space densities close to quantum degeneracy results in the opportunity to study many different aspects of few- and many body physics in the most extreme alkali atom combination. The key instrument of the cooling process and most further experiments is an optical dipole trap. Its design and setup will be described. Especially the requirements of high laser intensity and pointing stability in order to achieve long atom lifetimes and to minimize atomic losses had to be fulfilled. The Bose-Einstein condensate of cesium and the quantum degenerate Fermi gas of lithium are the starting point from which two routes can be taken. Either deeply bound, polar LiCs molecules can be created to observe dipolar effects or few-body effects like so called Efimov states can be studied.