Multi-component BECs

You-Quan Li

Zhejiang Institute of Modern Physics and Department of Physics,
Zhejiang University, Hangzhou 310027, China

Abstract

We give a brief description of theoretical studies on multi-component BEC in one dimension and some discussions on systems with atom-to-molecule conversion. We use Bethe-ansatz method to expose that the ground state of the one dimensional bosons with pseudo-spin is fully polarized and there is a quadratic spin wave mode. The conversion of two species of atoms into stable molecules through the Feshbach resonance assisted by stimulated Raman adiabatic passage in photoassociation is studied with the help of mean-field Langrange density. The conversion efficiency is large for the fully bosonic system as well as the boson-fermion mixture as long as the general two-photon resonance condition is satisfied. A proper magnetic field pulse sequence is shown to enhance molecular conversion efficiency.