

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Finite temperature effects of ${}^6\text{Li}$ - ${}^{40}\text{K}$ mixtures in the BCS-BEC crossover HAO GUO, CHIHCHUN CHIEN, YAN HE, Univ. of Chicago, QIJIN CHEN, Zhejiang Univ., KATHRYN LEVIN, Univ. of Chicago — Recent experiments on mixtures of ultra-cold fermions of different species inspire study of pairing between fermions with different masses. We study systematically ${}^6\text{Li}$ - ${}^{40}\text{K}$ mixtures with tunable attractive interactions in the BCS-Bose Einstein condensation crossover. Pairing fluctuations which are important at finite temperatures are included in a consistent fashion. Population imbalance of the two species is also considered. We found an intermediate-temperature superfluid phase which is similar to the one found in polarized Fermi gases with equal mass. We present superfluid transition temperature for a broad range of polarization and interaction strength and analyze stability of possible superfluid phases. Phase diagrams at and near unitarity are presented. Polarized superfluids are shown to be stabilized when the light species is the majority. Thus, in contrast to pairing between fermions with equal mass, observation of stable low-temperature polarized superfluids near unitarity is more feasible in ${}^6\text{Li}$ - ${}^{40}\text{K}$ mixtures.

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Date submitted: 21 Nov 2008

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