

Abstract Submitted
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Strongly interacting atomic Fermi gases in a trap with mass and population imbalances at finite temperature¹ JIBIAO WANG, Zhejiang University, HAO GUO, Hong Kong University, QIJIN CHEN, Zhejiang University — A great advantage of studying atomic Fermi gases is the easy tunability of multiple physical parameters, including interaction strength, mass and population imbalances, as well as species dependent trapping potential. Indeed, the mixture of ${}^6\text{Li}$ and ${}^{40}\text{K}$ gases has been of great interest, with and without population imbalance. In this talk, we will address the finite temperature phase diagrams of two component atomic Fermi gases with both mass and population imbalances in a trap, using a pairing fluctuation theory. We show that in certain parameter ranges, there exist intermediate temperature superfluids as well as phase separation with exotic sandwich-like shell structure with superfluid or pseudogapped normal state in the middle. We consider pairing strength over the entire range of BCS-BEC crossover. Our result is relevant to future experiment on mixtures of ${}^6\text{Li}$ and ${}^{40}\text{K}$ and possibly other Fermi atoms. References: H. Guo, C.-C. Chien, Q.J. Chen, Y. He, and K. Levin, Phys. Rev. A 80, 011601(R) (2009); C.-C. Chien, Q.J. Chen, Y. He, and K. Levin, Phys. Rev. Lett. 98, 110404 (2007); C.-C. Chien, Q.J. Chen, Y. He, and K. Levin, Phys. Rev. Lett. 97, 090402 (2006); Q.J. Chen, I. Kosztin, B. Janko, and K. Levin, Phys. Rev. Lett. 81, 4708 (1998).

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Qijin Chen
Zhejiang University

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