Probing the FFLO phase of a spin imbalanced 1D Fermi gas

ANN SOPHIE C. RITTNER, YEAN-AN LIAO, TOBIAS PAPROTTA, WENHUI LI, RANDALL G. HULET, Rice University — The search for the Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) phase, a polarized superfluid with a spatially varying order parameter, has generated large interest in both condensed matter and cold atoms communities. To date, there has been only indirect experimental evidence of FFLO in the heavy fermion superconductor CeCoIn5. In a 1D polarized Fermi gas, the FFLO phase is predicted to occupy a large region of the phase diagram. We have implemented a 2D optical lattice in order to explore experimental signatures of FFLO, for example in-situ density distributions or time of flight imaging. In this talk, we will present the experimental progress on both methods.

1Supported by DARPA, NSF, ONR, the Keck and Welch Foundations