

Interband effects in ultra-cold Fermi gases in optical lattices

Jani-Petri Martikainen, Nordita

In a two-component fermionic gas the atom numbers of different components can be independently controlled. This has been used to investigate strongly interacting polarized fermion gases, i.e. gases where the components have different atom numbers. Among other things, in such a system one can expect a multitude of correlated fermionic phases as well as superfluidity. Here we address the issue of a strongly polarized two-component Fermi gases in an optical lattice. Polarized Fermi gases on the lowest band have been studied previously, but here we wish to investigate the relevant theory as well as phases associated with it, when the majority component fills the lowest band and also populates excited bands. We will demonstrate that under such circumstances one can expect transitions between various kinds of paired states.