

L. Salasnich: *BCS-BEC crossover with Rashba and Dresselhaus couplings*

We study theoretically the effects of spin-orbit coupling on a two-spin-component ultracold atomic Fermi gas along the BCS-BEC crossover of a Feshbach resonance. We find that the condensate fraction of Cooper pairs characterizes the crossover better than other quantities, like the chemical potential or the pairing gap. We also find that, due to the spin-orbit coupling, in addition to singlet pairing, there is a finite triplet pairing. We predict that a large enough spin-orbit interaction enhances the singlet condensate fraction with respect to the triplet one in the BCS side while suppressing it on the BEC side.

[1] L. Dell'Anna, G. Mazzeella, L. Salasnich, Phys. Rev. A 84, 033633 (2011).

[2] L. Dell'Anna, G. Mazzeella, L. Salasnich, Phys. Rev. A 86, 053632 (2012).