Abstract

This work debates a theoretical investigation of the interfacial effects about heterostructures with normal metals and superconductors. At the beginning we will introduce the basic physical phenomena our calculations deal with and will describe a few experimental results. Then we will provide a description of the Blonder-Tinkham and Klapwijk (BTK) model for normal metal/superconductor junctions and we will introduce the attempt to generalize it to include proximity effect. After we will describe a generalized BTK model introducing a particle-hole mixing interface potential and we will present the main results. Finally, we will extend BTK model to include a spin-dependent potential, e.g. Rashba spin-orbit coupling, at the interface and we will analyze the spin transport properties.