Detection of charge transfers in Cooper pair box

CHIA-HENG SUN, PO-CHEN TAI, Department of Physics, National Central University, Jhongli, Taiwan, JHENG-AN JIANG, CEN-SHAWN WU, Department of Physics, National Changhua University of Education, Changhua, Taiwan, JENG-CHUNG CHEN, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan, YUNG-FU CHEN, Department of Physics, National Central University, Jhongli, Taiwan —

Cooper pair in a conventional superconductor (S) is composed of two spin-entangled electrons, and it may split into two non-superconductor (NS) regions via a process called crossed Andreev reflection. Such a spatially split entangled pair could be a quantum channel shared by two parties for quantum teleportation. However, several undesirable charge transfer processes are also involved at S/NS interfaces, such as quasi-particle tunneling, cotunneling, and ordinary Andreev reflection. In this poster we will discuss the importance of each charge transfer process in a system consisting of a superconducting island connected to two normal metal islands via two tunnel junctions, and inspect the efficiency of Cooper pair splitting in such scheme.

Pochen Tai
Department of Physics, National Central University, Jhongli, Taiwan