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Cooper pair splitting in isolated NSN island POCHEN TAI, CHIA-HENG SUN, 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, YUNG-FU CHEN, Department of Physics, National Tsing Hua University, Hsinchu, Taiwan — Cooper pair is in a maximally entangled two-particle state, and may have applications on solid state version of quantum teleportation. We investigate Cooper pair splitting, a charge-transfer process by crossed Andreev reflection (CAR), in a three-island system. The system consists of one superconducting island (S) and two normal-metal islands (N), while S connects to two N via two tunnel junctions. When the charging energy of the system is the dominant energy factor, this system is suitable to study charge transfers down to single-electron regime. Two single-electron transistors as charge sensors are capacitively coupled to two N, respectively, to observe charge tunneling events. Several competing charge-transfer processes as long with CAR also occur in two S/N interfaces, such as quasi-particle tunneling, co-tunneling, and ordinary Andreev reflection. Correlation measurements of charge fluctuation at two S/N interfaces should help to tell CAR process apart from other competing processes.

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