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Crossed Andreev reflection dominated subgap transport in normal metal/superconducting hybrid structures ANDREAS KLEINE, ANDREAS BAUMGARTNER, JELENA TRBOVIC, CHRISTIAN SCHONENBERGER, Department of Physics, Univ. of Basel, NANOELECTRONICS GROUP AT BASEL TEAM — We report on a systematic study of the non-local Andreev process (also called cross Andreev reflection = CAR) in planar mesoscopic N-S devices that consist of a superconducting (S) Al wire with several normal metal (N) fingers contacting the superconductor via tunneling barriers. We measure the non-local voltage appearing at a N (detector) contact located outside the current path, while a bias current is driven from another N (injector) contact to the S wire. This non-local differential signal has been studied as a function of bias and temperature for several samples with different N-S contact transparencies. In addition to CAR, elastic co-tunneling (EC) and charge imbalance (CI) appears in the measurements. We ob-serve a systematic dependence of the relative magnitude of CAR, EC and CI. Most strikingly, CAR can dominate the subgap transport for all energies below the superconducting gap for a certain kind of sam-ple. If the tunneling resistance R_t is increased, EC starts to dominate over CAR. This contribution is limited to small subgap biases, whereas CAR remains dominating at higher subgap biases. This de-pendence is explained by Coulomb blockade that becomes more prominent for increasing R_t.

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