

Adiabatic pumping in a double-dot Cooper pair beam splitter

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We study adiabatic pumping through a double quantum dot coupled to normal and superconducting leads. For this purpose a perturbation expansion in the tunnel coupling between the dots and the normal leads is performed and processes underlying the pumping current are discussed. Features of crossed Andreev reflection are investigated in the average pumped charge and related to local Andreev reflection in a single quantum dot. In order to distinguish Cooper-pair splitting from quasiparticle pumping, we compare the properties of Cooper-pair pumping with single-electron pumping in a system with only normal leads. The dependence on the average dot level and the coupling asymmetry turn out to be the main distinguishing features. This is contrasted with the linear conductance for which it is more difficult to distinguish single-particle from Cooper-pair transport.

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