Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Sub-gap cotunneling current through a spinfull quantum dot with superconducting leads JENS PAASKE, BRIAN ANDERSEN, KARSTEN FLENSBERG, University of Copenhagen — A number of recent experiments have measured the voltage driven current through a quantum dot with superconducting leads. By changing the gate voltage of the dot, several unusual properties of the sub-gap current have been revealed. For example, when the dot is occupied by an odd number of electrons, the cotunneling conductance exhibits regions of negative differential conductance as well as significant weight redistributions among the multiple Andreev scattering resonances. We have calculated the sub-gap cotunneling current within a general Hamiltonian approach, allowing us to treat the even occupied (spinless) dot exactly, and the odd occupied (spinfull) dot perturbatively. In the latter case, we present calculations of unusual sub-gap current and relate these finding to the experiments.

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Date submitted: 16 Dec 2008 Electronic form version 1.4