Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Andreev transport through quantum dots coupled to ferromagnetic and superconducting leads[1] IRENEUSZ WEYMANN, KRZYSZTOF WOJCIK, PIOTR TROCHA, Adam Mickiewicz University, Faculty of Physics — The local and nonlocal Andreev transport through the system consisting of quantum dot coupled to one superconducting electrode and two ferromagnetic leads is studied theoretically. The magnetizations of the leads are assumed to form either parallel or antiparallel magnetic configuration. To calculate basic transport characteristics, like Andreev current, local and nonlocal conductance, tunneling magnetoresistance, we employ the real-time diagrammatic technique assuming weak tunnel coupling of the dot to ferromagnetic leads. We study the effect of cotunneling processes on Andreev transport in the Coulomb blockade regime. We find a zero-bias anomaly of the Andreev differential conductance in the parallel configuration, which is associated with a nonequilibrium spin accumulation in the dot. We also analyze the linear response transport properties in the case of strong coupling to ferromagnetic leads, when the electronic correlations can lead to the Kondo effect. This transport regime is addressed by means of the numerical renormalization group method. We show that the linear conductance due to Andreev processes strongly depends on the magnitude of exchange field due to the presence of ferromagnetic leads, and the coupling strength to the superconducting lead.

[1]We acknowledge support from the project No. IP2011 059471 and the EU grant No. CIG-303 689.

Ireneusz Weymann
Adam Mickiewicz University, Faculty of Physics

Date submitted: 15 Nov 2013 Electronic form version 1.4