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Conductance and shot noise in ferromagnet-superconductor epitaxial tunnel junctions FARKHAD ALIEV, ISIDORO MARTINEZ, JUAN PEDRO CASCALES, Universidad Autonoma de Madrid, Spain, CORIOLAN TIUSAN, Technical University of Cluj-Napoca, Romania, MICHEL HEHN, Universit de Lorraine, Nancy, France — Recently ferromagnet/superconductor hybrids have attracted attention due to the possibility of inducing p-wave superconductivity and of creating novel superconducting-spintronic devices. Most of these devices have a lateral configuration and are non-epitaxial, so they could not provide coherent electron tunneling over the interfaces. Here we investigate the conductance and shot noise in fully epitaxial Fe/MgO/V/MgO/Fe, Fe/MgO/Fe/MgO/V and Fe/MgO/V tunnel junctions with 40 nm thick Vanadium and 2nm thick MgO as a function of the applied bias, temperature (down to 0.3K) and magnetic state. All junctions show presence of finite subgap conductance indicating coherent two-electron transport over the barrier. Moreover, we observe conductance anomalies above the gap suppressed at temperature exceeding critical temperature, which may imply quasiparticle interference effects. High crystalline quality of the MgO barriers is confirmed by the fact that the above gap shot noise is Poissonian (direct tunneling with single barrier) or sub-Poissonian (sequential tunneling over two barriers) and is magnetic state dependent in the last case. The subgap Fano factor shows strong increase supporting multiple Andreev reflections as a possible source of excess subgap conductance.

Farkhad Aliev
Universidad Autonoma de Madrid

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