

Abstract Submitted
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Anisotropic Andreev reflection in ferromagnet/s-wave superconductors (FS)¹ PETRA HOEGL, University of Regensburg, ALEX MATOS ABIGUE, IGOR ZUTIC, University at Buffalo, JAROSLAV FABIAN, University of Regensburg — Andreev reflection in FS junctions is a sensitive probe of the junction interface as well as of the spin polarization of the F region. By performing analytical and numerical calculations on widely accepted model systems, with interfacial Rashba and Dresselhaus spin-orbit fields, we show that Andreev reflection spectroscopy is also a sensitive tool of the interfacial spin-orbit coupling. In particular, we find a finite subgap conductance even in half-metallic systems due to the spin-flip Andreev reflection, imposing a triplet proximity effect. Furthermore, we predict a giant magnetic anisotropy of the Andreev reflection—anisotropic Andreev reflection (AAR)—with respect to the orientation of the F magnetization. We analyze the effects of the tunnel barrier strength, the F spin polarization, and the effective mass and Fermi wave vector mismatch. Our results should also have implications for designing Majorana states in semiconductor junctions with superconductors.

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