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Investigation of the Superconductor-Ferromagnet Proximity Region Using the Usadel Equation SERGE REYMOND, Stanford University, PAUL SANGIORGIO, Stanford University, TESU KIM, Seoul National University, JINHO KIM, Seoul National University, KOOKRIN CHAR, Seoul National University, MALCOLM BEASLEY, Stanford University — Due to its simplicity, the Usadel formulation is widely used to study the superconducting properties of heterostructures composed of superconductors (S), ferromagnets (F), and normal metals (N) in the dirty limit. In particular, with very simple boundary conditions and parameters, it quantitatively explains the non-monotonic relation between Tc and the ferromagnet thickness observed in SF bilayers. However, we find that the same simple analysis fails to explain the density of states measured in the F layer by tunneling spectroscopy. Based on experimental data taken in SF and SN bilayers, we discuss the validity of this approach and which of the ingredients – boundary resistance, spin-orbit scattering, tunneling barrier height, etc. – play a role in the real problem. Work supported by DoE BES.

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