Andreev effect in GaMnAs/Nb microstructures for improved extraction of spin polarization

JUSTIN GUENTHER, DIANA DAHLIAH, TAYLOR REID, ROBERT TOLLEY, CHRIS LITTLE, Miami University, XINYU LIU, JACEK FURDYNA, University of Notre Dame, KHALID EID, Miami University

— Point contact Andreev reflection is a powerful technique for extracting the spin polarization in a large variety of ferromagnetic materials. Yet, it produced conflicting data that proved difficult to model when studying spin polarization in GaMnAs, due in part to two main problems: the high resistivity of GaMnAs makes it difficult to isolate the interfacial conductance and characterize it properly and there can be a Schottky barrier at the GaMnAs/superconductor interface. We use photolithography to fabricate GaMnAs/Nb micro-structures that offer a direct way to extract the interface conductance and the spin polarization at the interface. Furthermore, our results show that the Schottky barrier can play a crucial role in determining the behavior of the interface conductance when varying the applied voltage.