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Field-Dependent Effects in Superconductors Coupled to Semiconducting Heterostructures[1] STEPHANIE LAW, Department of Physics and Materials Research Lab, University of Illinois at Urbana-Champaign, WADE DEGOTTARDI, SMITHA VISHVESHWARA, NADYA MASON, JAMES ECKSTEIN, University of Illinois at Urbana-Champaign — We report transport measurements between superconducting leads separated by a small InAs gap. The NbTi superconducting layer is grown in-situ on top of the InAs to allow good contact. The samples are then fabricated into Hall bars with narrow gaps between the superconducting leads. Differential resistance and IV characteristics are measured in two and four terminal setups at 300mK both on and off quantum Hall plateaus. Multiple Andreev reflection peaks are observed (up to n=4 in some cases) and their field dependence measured. As the field increases, the MAR peaks shift to lower voltages and follow a general scaling law which holds across devices with different gap lengths. One device shows a supercurrent at all fields and in this device, MAR peaks corresponding both to the superconducting gap as well as a proximity-induced normal gap are seen. Explanations for the field-dependence of the MAR peaks will be discussed.

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