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Transport Properties of a Hybrid SET-SQUID Device in Tunable Dissipative Environment. SHUCHAO MENG, JEFFREY QUILLIAM, CHAS MUGFORD, Department of Physics and Astronomy and Institute for Quantum Computing, University of Waterloo, Waterloo, ON, N2L 3G1, ANDY SACHRAJDA , Institute for Microstructural Sciences, NRC, 1200 Montreal Road, Ottawa, ON, K1A 0R6, JAN KYCIA, Department of Physics and Astronomy and Institute for Quantum Computing, University of Waterloo, Waterloo, ON, N2L 3G1 — We will present measurements of transport properties of a new type of superconducting device, designed to allow a fully adjustable Hamiltonian with charge term, Josephson coupling term, and dissipation term. This device consists of a superconducting Single Electron Transistor (sSET) and two Superconducting Quantum Interference Devices (SQUIDs). A 2D electron gas embedded 90nm below the substrate surface provides a tunable dissipative environment. A small magnetic field can be applied to drive this hybrid device from the strong Josephson coupling regime to the SET regime. Dissipation and temperature dependence of the switching current out of the zero-voltage state show different characteristics for different settings of competition between Josephson coupling and charging energy.

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