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Superconductor-Metal-Insulator Phase Transition in Ta Films YIZE LI, JONGSOO YOON, University of Virginia — We have reported the magnetically induced metallic phase in superconducting Ta films which intervenes the superconducting and insulating phases [1]. Recently, we studied the electronic transport properties of Ta film with various degrees of disorders which were controlled by film thickness. We found that as sample thickness decreases, the films undergo a superconductor-metal-insulator phase transition. Each phase exhibits distinct nonlinear current-voltage (I-V) characteristics, similar to those of magnetically induced superconductor-metal-insulator transition. We have measured the evolution of nonlinear I-V with changing magnetic field (B) and temperature (T), for representative samples with different degrees of disorders, which leads to the phase diagram in B-T-Disorder space. [1] Y.Qin et al., Phys. Rev. B 73, 100505(R) (2006).

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