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Magnetic Properties of Single Co Nanoparticles Probed by Tunneling and Microwaves WENCHAO JIANG, FELIPE TIJIWA BIRK, DRAGOMIR DAVIDOVIC, Georgia Institute of Technology — We present tunneling studies of magnetic hysteresis loops of single Co nanoparticles. The magnetic switching field at mK-temperature is strongly reduced as a function of bias voltage. At 10mV bias voltage, the switching field is reduced by 15%, while the magnetization can be switched by applying a voltage pulse of 10mV. The strong reduction of the switching field is not an artifact due to charge noise or Joule heating, nor it is a result of the electric field dependence of the surface anisotropy. Instead, the reduction represents the case of magnetic excitation driven by the tunnel current. The strength of the effect indicates strongly enhanced coupling between magnetic excitations and the tunnel current in ferromagnets with strongly reduced dimensions. We also present the first measurement of the magnetic relaxation time in a single Co nanoparticle (∼microsecond) , obtained by combining tunneling spectroscopy and microwave pumping.

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