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Spin transfer torque switching of Co nanoparticles[1] HAN ZOU, Department of Physics and Astronomy University of Delaware, XIAOJUN WANG, YI JI, Department of Physics and Astronomy University of Delaware — Spin transfer torque effect has potential application in Magnetic Random Access Memory (MRAM) devices as a way to address the memory elements. Most spin transfer studies are based on patterned multilayer thin films with 100 nm lateral dimension. In this work, we demonstrate the feasibility of the spin transfer switching of a few cobalt nanoparticles with a diameter of < 5 nm at 4.2 K. The motivation arises from the prospect of device miniaturization and the capability to manipulate an individual magnetic nanoparticle. We use a multilayer thin film Cu(100nm)/Co(10nm)/Cu(3nm)/Co(0.5nm)/Au(2nm). The 0.5 nm Co layer is not continuous, and it consists of isolated Co particles formed due to surface tension. A mechanical point contact is formed on the multilayer film at 4.2K. By varying the size of the contact, the number of nanoparticles underneath a point contact can be controlled between $\sim$5 and $\sim$50. Hysteretic loops in $dV/dI - I$ measurements clearly indicates spin-transfer switching. The dV/dI-I curves are qualitatively different between point contacts involving only few particles (5-10) and those involving many particles (40-50).

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