

Abstract Submitted
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Material dependence of magnetic hysteresis in single nanometer-scale ferromagnetic particles¹ PATRICK GARTLAND, WENCHAO JIANG, DRAGOMIR DAVIDOVIC, Georgia Inst of Tech — The characteristics of ferromagnetic particles change remarkably when their size approaches the nanometer scale and below. We conduct single-electron tunneling experiments to study the breakdown of magnetic hysteresis in single particles 2-5 nm in diameter, made of Co, Fe, Ni, and Py= $\text{Ni}_{0.8}\text{Fe}_{0.2}$. At $T = 4.2\text{K}$ and at mK-temperature, we observe a dramatic difference in magnetic hysteresis among these metals: All of the Co and Fe particles, but only 4% of the Ni particles exhibit magnetic hysteresis. The tunneling spectra of Ni particles at mK-Temperature display evidence of ferromagnetism, despite the absence of hysteresis. We will present recent experimental data that will shed light on the possible mechanisms driving this strong suppression of hysteresis in Ni.

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