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Current-Induced Magnetization Switching (CIMS) for 'Ballistic' and 'Diffusive' Transport Through the Non-Magnetic (N) metal in Permalloy/N/Permalloy Nanopillars[1] NIKOLETA THEODOROPOULOU, AMIT SHARMA, MUSTAFA ALHAJ-DARWISH, WILLIAM PRATT JR., JACK BASS, Physics Department, Michigan State University — . Adding 5% Ge to Cu decreases the mean-free-path, λ, at 4.2K from $\sim$ 130 nm to $\sim$ 3.8 nm, while still leaving the spin-diffusion length $\geq$ 40 nm. Thus, comparing the CIMS switching currents at 4.2K for sputtered Py/N/Py with layer thickness t_N = 10nm for N = Cu or Cu(5%Ge), allows testing of the importance of 'quasi-ballistic'– $(t_{Cu}/\lambda_{Cu}) \sim 0.08$, versus 'quasi-diffusive'—$(t_{CuGe}/\lambda_{CuGe}) \sim 2.6$, transport, with at most minor correction for spin-flipping in the N-metals. At 4.2K we find a ratio of switching currents, ΔI_s(CuGe)/ΔI_s(Cu) = 1.3 $\pm$ 0.2, where ΔI_s is the sum of the magnitudes of the critical current for switching from parallel to anti-parallel magnetic order and vice-versa. We will compare this ratio with values calculated using different models.

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Jack Bass
Michigan State University

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