Abstract Submitted
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Current induced incoherent magnetization dynamics in ferromagnetic/non-magnetic metallic multilayer nanowires[1] MD MAMUN AL-RASHID, Virginia Commonwealth University, MAZIN MAQABLEH, BETHANIE STADLER, University of Minnesota, JAYASIMHA ATULASIMHA, Virginia Commonwealth University — High density arrays of electrodeposited nanowires consisting of ferromagnetic/non-magnetic (Co/Cu) multilayers are promising as magnetic memory devices[1−3]. For individual nanowires containing multiple (Co/Cu) bilayers, the stable magnetization orientations of the Co layers (with respect to each other and the nanowire axis) are dependent on the Cu layer thickness, even when the Co layer dimensions are fixed. This dependence is a result of the competition between shape anisotropy, magnetocrystalline anisotropy and intra-wire dipole coupling. However, when the nanowires are closely packed in arrays, inter-wire dipole coupling can result in complex and tunable domain structures comprising segments of multiple nanowires[4]. This work explores the dependence of these domain structures and their switching on the non-magnetic layer thickness and intra-wire spacing both experimentally and via rigorous micromagnetic simulation. These domain structures play a crucial role in determining the current and time required for STT switching. [1]Piraux et al, Appl. Phys. Lett. 65, 2484 (1994). [2]Maqableh et al. Nano Lett. 12, 4102 (2012). [3]Hernandez et al. J. Appl. Phys. 109, 07C916 (2011). [4]Grutter et al. MMM Conference 2016, New Orleans, LA, USA.

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Md Mamun Al-Rashid
Virginia Commonwealth University

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