

Abstract Submitted
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Periodic Magnetic Domains on Single-Crystalline Cobalt Filaments.¹ FEI CHEN, FAN WANG, FEI JIA, JINGNING LI, RU-WEN PENG, MU WANG, National laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China, MU WANG TEAM — Magnetic structures with controlled domain wall pattern may be applied as potential building blocks for three-dimensional magnetic memory and logic devices. Using a unique electrochemical self-assembly method, we are able to achieve regular single-crystalline cobalt filament arrays with specific geometric profile and crystallographic orientation, and the magnetic domain configuration can be conveniently tailored [1]. We observe the transition of periodic anti-parallel magnetic domains to a compressed vortex magnetic domains, which depends on the ratio of height vs. width of the wires. A "phase diagram" has been obtained to describe the dependence of the type of magnetic domains and the geometrical profiles of the wires. Magnetoresistance of the filaments demonstrates that the contribution of series of 180domain walls is about 0.15% of the zero-field resistance $\rho(H=0)$. These self-assembled magnetic nano-filaments, with controlled periodic domain patterns, offer an interesting platform to explore domain-wall-based memory and logic devices. [1] F. Chen et al., Phys. Rev. B 93, 054405 (2016).

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Mu Wang
National laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China

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