Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Magnetic Domain Structures in an In-plane Array of Cobalt Filaments with Periodic Structures MU WANG, WEI HAN, XIANG XIONG, Natl. Lab. Solid State Microstructures, Nanjing University — With a unique electrochemical deposition method we fabricated in-plane arrays of straight cobalt filaments with periodic corrugations over a silicon substrate without using templates. The periodic corrugations on the filaments are induced by spontaneous oscillation in electrodeposition, and the periodicity can be tuned from a few tens of nanometers to a few hundreds of nanometers by controlling the electric current in experiments. Magnetic force microscopy indicates that each corrugated structure on the filament may correspond to a local single magnetic domain. When the inter-filament separation is large, the magnetic domains are regularly aligned along the filament. The domains become random when the filaments are closely packed. We suggest that our results could be helpful in understanding the evolution of magnetic domain patterns on microscopic scale and may have potential application in spintronics.

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Date submitted: 21 Nov 2008 Electronic form version 1.4