Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The Realization of Artificial Kondo Lattices in Nanostructured Arrays DEEPAK SINGH, National Institute of Standard and Technology, MARK TUOMINEN, University of Massachusetts, Amherst — Kondo lattice systems are described by intermetallic compounds of rare earth elements which contain a chemically ordered lattice of local moments that are coupled to the compound's conduction electrons via Kondo interaction. We will present a simple method to artificially create Kondo lattice systems in nanostructured arrays. Artificial Kondo lattices were fabricated using thin Nb film (10 nm thickness) with magnetic impurities, Co, embedded in a periodic (28 nm) hexagonal matrix. By controlling the percentage of magnetic impurities embedded in the thin film, we were able to control the strength of exchange coupling interaction between magnetic impurity's moments and conduction electrons spins. Electrical transport measurements and magnetoresistivity measurements of artificial lattices reflected the Kondo lattice properties found in rare-earth element compounds. Experimental data will be discussed in the wake of present theoretical models. An interesting observation of normalized logarithmic behavior of resistivity as a function of temperature will also be discussed.

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Date submitted: 20 Nov 2009 Electronic form version 1.4