Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Element Specific Observation of Ferromagnetic Interlayer Exchange Coupled Dual Vortex Core Nano Systems JAVIER PULECIO, DARIO ARENA, Brookhaven National Laboratory, PETER WARNICKE, Swiss Light Souce, MI-YOUNG IM, Lawrence Berkeley National Laboratory, SHAWN POLLARD, Brookhaven National Laboratory, PETER FISCHER, Lawrence Berkeley National Laboratory, YIMEI ZHU, Brookhaven National Laboratory — We report on the magnetic evolution of magnetic vortices in nanoscale and multilayer disk structures. The tri-layer structure consists of Co and Permalloy (Py) layers, coupled across a thin (1nm) Cu spacer that provides strong coupling between the Co and Py layers. Element-resolved full-field XMCD microscopy is combined with ultra-high resolution Lorentz transmission electron microscopy, permitting measurement of both layer-resolved domain patterns and the vortex structure averaged across the tri-layer. We examine the evolution of the vortex structure while the nanostructure is cycled through the M-H hysteresis loop. In particular we will discuss the effects of strong interlayer exchanged coupling on a dual vortex core system, including analysis of the layer-resolved coercivity, and the evolution, deformation, annihilation, and nucleation of the vortices.

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Date submitted: 09 Nov 2012 Electronic form version 1.4