Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Scanning Hall probe microscopy of vortex structures in mesoscopic BSCCO disks MILORAD MILOŠEVIC, MALCOLM CONNOLLY, SIMON BENDING, University of Bath — It is now well established that vortex behavior in mesoscopic superconductors is strongly influenced by the sample geometry [L.F Chibotaru et al. Nature (2000)]. In particular, the topological confinement directly reflects on the symmetry of multi-vortex structures, especially in highly symmetric samples such as disks, squares, and equilateral triangles [B.J. Baelus et al. PRB (2002), I.V. Grigorieva et al. PRL (2006)]. Advances in nanofabrication techniques have stimulated the use of transport and magnetic imaging measurements to deduce the arrangement of vortices indirectly. Recent breakthroughs in scanning Hall probe microscopy (SHPM) at the University of Bath have made it possible to image vortex configurations *directly*. Using photolithographic patterning and Ar+ ion beam milling, we have machined arrays of isolated micro-disks suitable for investigation by SHPM. Disk diameters are of the order of the SHPM scanning range, making it possible to image entire samples and hence assess the interaction between the sample geometry, the Meissner screening currents, and the multi-vortex configurations. The results are fully corroborated by Ginzburg-Landau theory, where finite demagnetization effects were taken into account and the stray magnetic field has been simulated in 3D.

Malcolm Connolly
University of Bath

Date submitted: 28 Nov 2006 Electronic form version 1.4