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Vortex dynamics in an equilateral triangular arrangement of three magnetic disks X. M. CHENG, Physics Department, Bryn Mawr College, D. J. KEAVNEY, Advanced Photon Source, Argonne National Lab, D. J. CLARKE, Department of Physics and Astronomy, University of California, Riverside, O. TCHERNYSHYOV, Department of Physics and Astronomy, Johns Hopkins University, M. MAHONEY, Physics Department, Bryn Mawr College, A. MELIKYAN, MSD, Argonne National Lab — Magnetic vortices in micron-sized ferromagnetic disks have been of great interest because of their potential applications in data storage. While the motion of a vortex in a single isolated magnetic disk has been studied extensively, vortex dynamics in multiple-disk planar geometries remains to be fully understood. We report direct time-resolved imaging and theoretical calculations of the vortex states in an equilateral triangular arrangement of three magnetic disks with varied center-to-center spacings. The free-motion trajectories of the vortex cores in the triangular arrangement of three permalloy disks of 2 micron radius were traced using time-resolved x-ray photoemission electron microscopy at beamline 4-ID-C of the Advanced Photon Source. The temporal resolution is 90 ps. The oscillation amplitude in the tri-disks with 4.5 micron center spacing was smaller than that with 5 micron center spacing. No significant frequency shift was observed. Theoretical calculation showed both frequency shift and trajectory change due to dipolar interaction of the disks at varied spacings.

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