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Vortex Resonance in Coupled Ferromagnetic Disks SHIKHA JAIN, HELMUT SCHULTHEISS, JOHN PEARSON, FRANK FRADIN, SAMUEL BADER, VALENTYN NOVOSAD, Argonne National Laboratory — Advances in nanolithography and thin film growth techniques offer the unique opportunity to prepare a variety of laterally confined nanostructured magnets. Of particular interest are lithographically patterned micron and submicron disk-shaped particle arrays. The magnetic ground state in confined geometries consists of a curling spin configuration, known as a vortex state. Studies of vortex dynamics have mainly focused on circular or elliptical dots at remanence. In this work, we investigate the dynamic response of vortex gyration in interacting systems where two circular dots are statically exchange coupled. The induced coupling due to the interacting area forces the disks to have antiparallel chirality of magnetization. Apart from different vortex polarity combinations, various frequency modes were observed as a function of external magnetic field and contact length. Moreover, due to the induced configurational anisotropy in the system, vortex resonance in the two disks was found to be strongly dependent on the orientation of the static magnetic field.

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