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Polarity reversal of magnetic vortex core by in-plane non-resonant pulsed magnetic field[1] XUEMEI CHENG, DAVID KEAVNEY, Argonne National Laboratory, KRISTEN BUCHANAN, Colorado State University — Magnetic vortices have been of great interest because of their potential applications in non-volatile data storage. Recently, Van Waeyenberge et al. demonstrated vortex core reversal in permalloy squares using an in-plane r.f. excitation field with the frequency close to the translational-mode eigenfrequency. In this work we report polarity reversal of magnetic vortex core by non-resonant in-plane field pulses. The core polarity was first determined by watching the sense of vortex core gyration in a 6 micron permalloy disk imaged by time-resolved x-ray photoemission electron microscopy (TR-PEEM) with 1mT excitation field pulses. After the waveguide was pulsed at 5mT, we determined core polarity at 1mT again. We demonstrate that the core polarity can be switched back and forth by pulsing at 5mT. The micromagnetic simulations and TR-PEEM images confirm that when the core is displaced beyond 25% of disk radius, distortions of the core region occur, promoting a transient domain state involving a complex cross-tie wall, and subsequent reversal of the core polarity.

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