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Single vortex dynamics in patterned ferromagnetic ellipses[1] KRISTEN BUCHANAN, Argonne National Laboratory, PIERRE ROY, Angstrom Laboratory, Sweden, MARCOS GRIMSDITCH, FRANK FRADIN, KONSTANTIN GUSLIENKO, SAM BADER, VAL NOVOSAD, Argonne National Laboratory, USA, ARGONNE NATIONAL LABORATORY, USA TEAM, ANGSTROM LABORATORY, SWEDEN TEAM — Measurements of low frequency dynamics of single magnetic vortices confined in elliptic ferromagnetic dots made of Permalloy with dimensions 2x1 μm^2 and 3x1.5 μm^2, 40-nm thick, have been performed using a microwave reflection method. Resonances were recorded in the sub-GHz range that can be attributed to the vortex translational mode where the vortex core follows an elliptic trajectory around its equilibrium position. The existence of single vortex states in the samples was confirmed by magnetic force microscopy. The frequency of this translational mode varies little under the influence of an in-plane static field H along the easy axis, however, it increases by more than a factor of two when H is applied along the hard axis. Micromagnetic simulations are used to explore the origin of the observed field dependence.

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