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Magnetoresistance oscillations in single-crystal $NbSe_2$ nanowires designed for the study of vortex dynamics[1] SHAUN MILLS, The Pennsylvania State University, NEAL STALEY, Massachusetts Institute of Technology, JACOB WISSER, The Pennsylvania State University, CHENYI SHEN, ZHUAN XU, Zhejiang University, YING LIU, The Pennsylvania State University — The dynamic behavior of Abrikosov vortices has been of long-standing interest, both from fundamental and application-based perspectives. While data on static configurations of vortices and the collective motion of a vortex lattice have been accumulating, studies of vortex dynamics in nanoscale samples are rare. We have pursued electrical transport measurements on devices made of single-crystal $NbSe_2$ flakes – overcoming large challenges in the fabrication of these single-crystal nano-devices – in order to detect the motion of individual Abrikosov vortices. We also carried out recalculations of vortex configurations in our devices in the London approximation to assist the designing of our experiments. By tuning the strength of an external magnetic field and sample geometry, individual vortices can be confined within our devices. We present our recent progress towards the controlled motion of individual Abrikosov vortices, along with transport measurements on $NbSe_2$ nanowires, the latter of which reveal unexpected magnetoresistance oscillations attributable to vortex related physics.

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Shaun Mills
The Pennsylvania State University

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