Abstract Submitted
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Vortex motion in superconducting single-crystal microstructures of $NbSe_2$[1] SHAUN MILLS, NEAL STALEY, CONOR PULS, The Pennsylvania State University, CHENYI SHEN, LINJUN LI, ZHUAN XU, Zhejiang University, YING LIU, The Pennsylvania State University — Superconducting microstructures prepared by advanced nanofabrication methods can be used to address long-standing, fundamental questions concerning vortex motion, including vortex tunneling and the Aharonov-Casher effect of vortices. The observation of these phenomena requires devices with minimal disorder and the fewest dissipative normal electrons. We have developed a process to fabricate superconducting microstructures from single-crystal ultrathin flakes of the layered Type II superconductor $NbSe_2$. Our process utilizes a multi-step electron beam lithography technique, whereby a $NbSe_2$ flake is cut into a desired microstructure with appropriate electrical leads. Despite the small device dimensions, which feature line widths less than 40 nanometers, our devices are superconducting. We are currently working on superconducting microstructures of $NbSe_2$ that involve integration of aluminum leads, aiming at the control and measurement of vortices in these novel structures.

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Shaun Mills
The Pennsylvania State University

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