Abstract Submitted
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**Detection of vortex trapping in mesoscopic single-crystal loops of $NbSe_2$ by magnetoresistance oscillations**[1] SHAUN MILLS, The Pennsylvania State University, CHENYI SHEN, ZHAUN XU, Zhejiang University, YING LIU, The Pennsylvania State University, Shanghai Jiao Tong University — Vortex crossing of a doubly-connected mesoscopic loop of a type II superconductor will lead to magnetoresistance oscillations because the free energy of the loop is modulated by the enclosed flux. The amplitude and temperature dependence of the oscillations in these mesoscopic loops of type II superconductors differ from the conventional Little-Parks effect. In addition to Abrikosov vortex crossing, vortex trapping within the arms of a mesoscopic loop should be possible. London calculations predict a phase shift in the free energy modulation when a single vortex is trapped within the arm of a superconducting loop. We present magnetoresistance measurements on mesoscopic, single-crystal $NbSe_2$ loops exhibiting the anticipated free energy modulation phase shift at a critical vortex trapping field that can be tuned by sample geometry, temperature, and external current in agreement with theoretical expectations.

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