

Abstract Submitted  
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**Fluxon Controlled Resistance Switching in Centimeter-Long Superconducting Gallium-Indium Eutectic Nanowires**<sup>1</sup> WEIWEI ZHAO, JESSE BISCHOF, XIN LIU, JIMMY HUTASOIT, THOMAS FITZGIBBONS, Pennsylvania State Univ, LIN WANG, HPSync, Carnegie Institution of Washington, ZHONGHOU CAI, SI CHEN, Advanced Photon Source, Argonne National Laboratory, JOHN HAYES, PIER SAZIO, Optoelectronics Research Centre, University of Southampton, United Kingdom, CHAOXING LIU, JAINENDRA JAIN, JOHN BADDING, MOSES CHAN, Pennsylvania State Univ — We observe unexpected hysteretic behavior in centimeter long quasi 1D nanowires of Ga-In eutectic in transport measurements in the presence of a magnetic field. In particular, in some parts of the phase diagram, the system can exist in one of two stable states with different resistances. We propose that the nonzero resistance occurs when a spontaneously nucleated Ga droplet along the length of the nanowire traps a superconducting fluxon and, thereby, triggers phase slips in a nearby Ga droplet. The Ga-In nanowires thus provide a platform wherein the resistance can be switched on and off by the addition of a single fluxon. The presence of pure Ga droplets in the Ga-In nanowire was confirmed by X-ray fluorescence studies conducted in Advanced Photon Source. The long length of the nanowire increases the probability of a wire containing two nearby droplets.

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