

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Electronic transport properties of suspended few-nm black phosphorus nanoribbons**<sup>1</sup> PAUL MASI H DAS, GOPINATH DANDA, University of Pennsylvania, ANDREW CUPO, Rensselaer Polytechnic Institute, PRIYANKA JOTHI THIRURAMAN, University of Pennsylvania, VINCENT MEUNIER, Rensselaer Polytechnic Institute, MARIJA DRNDIC, University of Pennsylvania — Theoretical studies of few-nm wide black phosphorus nanoribbons have revealed highly tunable, width-dependent properties such as modulation of bandgap magnitude and carrier mobility. Due to the atmospheric instability of black phosphorus in the few-layer regime and a lack of suitable lithographic patterning techniques, these structures have yet to be reported. Here, we demonstrate the fabrication of few-nm wide and thick black phosphorus nanoribbons via in situ electron beam nanosculpting. We also present in situ orientation- and width-dependent two-terminal electronic transport measurements of these structures. These measurements yield valuable insight into the semiconducting properties of black phosphorus and its associated lower-dimensional nanostructures.

<sup>1</sup>NIH Grant R21HG007856, NSF Grant EFRI 2-DARE (EFRI-1542707)

Gopinath Danda  
University of Pennsylvania

Date submitted: 11 Nov 2016

Electronic form version 1.4