Abstract Submitted
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Electrical and structural properties of elemental Sb quantum wells grown by molecular beam epitaxy[1] KAUSHINI WICKRAMASINGHE, CHOMANI GASPE, SHAYNE CAIRNS, LIN LEI, NOLAN TEASDALE, TETSUYA MISHIMA, JOEL KEAY, SHEENA MURPHY, MICHAEL SANTOS, University of Oklahoma — Elemental Sb has gained attention recently because calculations indicate that the inherently large spin-orbit coupling enables topological insulator behavior. Because the band structure of bulk elemental Sb is semi-metallic, transport measurements will be dominated by bulk conduction. Our goal is to suppress the bulk conductivity by quantum confinement in thin Sb layers, to enable transport measurements of topological surface states. A growth procedure was developed to realize ultra-thin layers of Sb with thickness of $\sim$ 1nm to 10nm. Field-emission scanning electron microscopy and transmission electron microscopy measurements of ultra-thin Sb QWs show good crystalline quality with a suppression of the bulk conductivity at 20K by as much as 400x. We will discuss the epitaxial growth procedure for Sb quantum wells with GaSb barriers grown on GaAs(111)A and GaSb(111)A substrates. We will also discuss characterization of the structural and electrical properties of the ultra-thin films.

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