Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Electronic transport properties of $PbTiO_3/SrRuO_3$ superlattices[1]
HSIANG-CHUN HSING, SARA CALLORI, JUDITH GABEL, FEN GUAN, MARIVI FERNANDEZ SERRA, XU DU, MATTHEW DAWBER, Department of Physics and Astronomy, Stony Brook University — First principles calculations on $PbTiO_3/SrRuO_3$ superlattices indicate that even when the $SrRuO_3$ layers in these structures are only a single unit cell thick they retain a metallic character. In the out of plane direction the resistivity of the structures are expected to depend on the thickness of the $PbTiO_3$ layers which act as ferroelectric tunneling barriers. We have successfully fabricated high quality specimens of these superlattices using off axis RF magnetron sputtering and here we report on their transport properties. In the out of plane direction, as well as showing ferroelectric polarization-field hysteresis loops, the samples reveal tunneling characteristics that confirm that the $SrRuO_3$ layers do indeed retain their metallicity in the experimental realization of these structures. In addition to studying the effect of changing the thickness of the $PbTiO_3$ layers in the superlattice we have examined the impact that the ferroelectric polarization and the compositionally broken inversion symmetry have on current-voltage characteristics.

[1]Research supported by NSF DMR1334867, DMR1055413

Hsiang-Chun Hsing
Stony Brook University

Date submitted: 15 Nov 2013 Electronic form version 1.4