Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Disorder induced correlation gap suppresses superconductivity in the 5d metallic perovskite $Ba_{1-x}La_xPbO_3$ CAROLINA ADAMO, Stanford University, DANIEL SHAI, BREDAN FAETH, Cornell University, PHILIP WU, Stanford University, KYLE SHEN, DARRELL SCHLOM, Cornell University, MALCOLM BEASLEY, Stanford University — We report the synthesis and characterization of the electronic structure of thin films of the perovskite $Ba_{1-x}La_xPbO_3$ grown by oxide molecular-beam epitaxy. Using angle-resolved photoemission spectroscopy our measurements reveal a Fermi surface consistent with density functional calculations at low doping, but indicate the formation of an energy gap at higher doping values ($x \sim 0.2$), consistent with electrical transport measurements. By comparison with temperature-dependent point contact tunneling spectroscopy measurements, we show this behavior is consistent with a disorder-driven correlation gap. Moreover the photoemission data reveal a density of states that is not linear at high binding energies, suggesting discrepancy with previous tunneling density of states measurements of superconducting oxides.

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Date submitted: 14 Nov 2014 Electronic form version 1.4