Abstract Submitted
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Metal-insulator transition in epitaxial perovskite $SrIrO_3$ thin films via strain[1] J.H. GRUENEWALD, J. TERZIC, J. NICHOLS, G. CAO, S.S.A. SEO, Dept. of Physics and Astronomy, University of Kentucky — Iridates have drawn considerable interest due to their exotic phases arising from the interplay of the strong spin-orbit interaction and the electronic correlation. Here we will discuss our experimental investigations of the electronic properties of epitaxially strained $SrIrO_3$ thin-films. The orthorhombic perovskite crystal phase of $SrIrO_3$ is synthesized as a thin film ($\sim$ 20 nm) on various substrates of $(LaAlO_3)_{0.3}$-$(Sr_2AlTaO_6)_{0.7}$, $SrTiO_3$, $GdScO_3$, and MgO using pulsed laser deposition. We have observed that when the in-plane lattice parameters are tuned from tensile to compressive strain, the electronic behavior of the strained $SrIrO_3$ thin-films changes from metallic to insulating. All samples have sheet resistance below 13 k$\Omega/\Box$, and the insulating samples were fit using the Mott variable-range-hopping equation at low temperatures (< 15 K), which is believed to be the conducing mechanism of Anderson localization at finite temperature. The strain-dependent metal-insulator transition in epitaxial perovskite $SrIrO_3$ thin-films offers an important insight into the electronic structure of these strongly correlated, spin-orbit-coupled materials.

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