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Magnetotransport properties of Sr_2IrO_4 thin films modulated by epitaxial strain LUDI MIAO, DAE HO KIM, ZHIQIANG MAO, Tulane University — Sr_2IrO_4 (SIO) has attracted much attention due to its J_{eff} =1/2 Mott state induced by relativistic spin-orbit coupling [1]. In $3d/4d$ transition metal oxides, exotic phenomena, such as high-T_C superconductivity and colossal magnetoresistance, occur when a Mott insulting state is suppressed by charge carrier doping or band width tuning. Whether the Mott state in SIO can be tuned to new exotic states is an interesting question under active investigation. We have grown epitaxial SIO films on the substrates of $SrTiO_3$(STO) and $NdGaO_3$ (NGO) using a pulsed laser deposition method and investigated the strain effect on the properties of SIO. The SIO/STO film exhibits a tetragonal structure, while the SIO/NGO film displays a orthorhombic structure due to the NGO's orthorhombic nature. Although both types of films show insulating properties, their magnetic properties appear to be distinct: the SIO/STO film shows negative magnetoresistance (MR) with negligible anisotropy, whereas the SIO/NGO film exhibits positive MR with two-fold anisotropy. Such differences in magnetotransport imply the strong coupling between the lattice, spin and orbital degrees of freedom in SIO.

[1] B.J. Kim *et al.*, Phys. Rev. Lett. **101**, 076402 (08).

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