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Magnetism and anisotropy of Ir^{5+} based double perovskites Sr_2CoIrO_6 and Sr_2FeIrO_6[1] JASMINKA TERZIC, S.J. YUAN, Center for Advanced Materials, Department of Physics and Astronomy, University of Kentucky, Lexington, KY 40506, USA, W.H. SONG, Institute of Solid State Physics, Chinese Academy of Sciences, Hefei, China, S. ASWARTHAM, G. CAO, Center for Advanced Materials, Department of Physics and Astronomy, University of Kentucky, Lexington, KY 40506, USA — We report on structural, thermodynamic and transport study of single-crystal double perovskites Sr_2CoIrO_6 and Sr_2FeIrO_6. The isostructural Sr_2CoIrO_6 and Sr_2FeIrO_6 feature a cubic crystal structure with pentavalent $Ir^{5+}(5d^4)$ which are anticipated to have J=0 singlet ground states in the strong spin-orbit coupling limit. Here we observe magnetic coupling between 5d and 3d (Co, Fe) elements, which result in antiferromagnetic order at high temperatures in both double perovskites. Of the two, Sr_2CoIrO_6 displays antiferromagnetic metallic behavior with a pronounced magnetic anisotropy; in sharp contrast, the isostructural Sr_2FeIrO_6 exhibits an antiferroamagnetic, insulating ground state without discernible magnetic anisotropy. The data will be discussed and presented with comparisons drawn with similar systems.

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