

Abstract Submitted
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A hidden non-dipolar magnetic order parameter in Sr_2IrO_4 observed using nonlinear optical measurements LIUYAN ZHAO, Ins. for Q. Info. and Matt., California Institute of Technology, VSEVOLOD IVANOV, Department of Physics, California Institute of Technology, DARIUS TORCHINSKY, HAO CHU, Ins. for Q. Info. and Matt., California Institute of Technology, RON LIFSHITZ, Department of Physics and Astronomy, Tel Aviv University, REBECCA FLINT, Department of Physics and Astronomy, Iowa State University, TONGFEI QI, GANG CAO, Department of Physics and Astronomy, University of Kentucky, DAVID HSIEH, Ins. for Q. Info. and Matt., California Institute of Technology — Iridium oxides are predicted to host a variety of exotic electronic phases arising from the interplay of electron correlations and spin-orbit coupling. There is particular interest in Sr_2IrO_4 owing to its striking structural and electronic similarities to the parent compound of high-Tc cuprates La_2CuO_4 , which is further strengthened by the recent observation of Fermi arcs with a pseudogap behavior in doped Sr_2IrO_4 [1]. In this talk we report evidence of a previously hidden non-dipolar order parameter in Sr_2IrO_4 using low temperature nonlinear optical generation techniques [2,3]. We will discuss the significance of this novel order parameter in the context of cuprate high-Tc superconductivity and present comparative studies on non-perovskite families of iridium oxides.

[1] Y.K. Kim et. al, Science, 345, 187(2014)

[2] D. H. Torchinsky et. al, Rev. Sci. Instrum. 85, 083102(2014)

[3] D. H. Torchinsky et. al, arXiv 1411.0783(2014)

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