

Abstract Submitted  
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**Interplay of charge order and magnetism in  $\text{LuFe}_2\text{O}_4$**  M. ANGST, Oak Ridge National Laboratory, Oak Ridge TN, R.P. HERMANN, Institut fuer Festkoerperforschung, Forschungszentrum Juelich, Germany, A.D. CHRISTIANSON, W. TIAN, R. JIN, B.C. SALES, D. MANDRUS, Oak Ridge National Laboratory, Oak Ridge TN — Ferroelectricity in  $\text{LuFe}_2\text{O}_4$  may originate from charge order and seems to be coupled the magnetism as well. For both charge order and magnetism, conflicting reports have been published. We have recently grown single crystals exhibiting features in magnetization sharper than previously reported and suggesting an additional transition around 175 K. Neutron scattering experiments have revealed 3D magnetic and charge order. We will present recent synchrotron, calorimetry, and magnetization measurements on these crystals, which indicate a subtle interplay of magnetism, charge order, and structural distortions. Superstructure reflections studied include  $(1/3, 1/3, n)$  and  $(n/2)$  (exhibiting small systematic deviations away from  $1/3$ ), satellites to  $(0, 0, 3/2n)$  and  $(1/3, 1/3, n)$  and  $(n/2)$ , and two other types of reflections. Supported by the Division of Materials Sciences and Engineering, Office of Basic Energy Sciences, US Department of Energy.

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