

Abstract Submitted
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Charge order, dynamics, and magneto-structural transition in multiferroic LuFe_2O_4 ¹ XIAOSHAN XU, University of Tennessee, Knoxville, MANUEL ANGST, Oak Ridge National Laboratory, TATIANA BRINZARI, University of Tennessee, Knoxville, RAPHAEL HERMANN, Institut für Festkörperforschung, Forschungszentrum Jülich GmbH, Université de Liège, JANICE MUSFELDT, University of Tennessee, Knoxville, ANDY CHRISTIANSON, Oak Ridge National Laboratory, DAVID MANDRUS, Oak Ridge National Laboratory, University of Tennessee, BRIAN SALES, Oak Ridge National Laboratory, STEVE MCGILL, National High Magnetic Field Laboratory, JONG-WOO KIM, Ames Laboratory, ZAHIRUL ISLAM, Argonne National Laboratory — We investigated the series of temperature and field-driven transitions in LuFe_2O_4 by optical and Mössbauer spectroscopies, magnetization, and x-ray scattering in order to understand the interplay between charge, structure, and magnetism in this multiferroic material. We demonstrate that charge fluctuation has an onset well below the charge ordering transition, supporting the “order by fluctuation” mechanism for the development of charge order superstructure. Bragg splitting and large magneto optical contrast suggest a low temperature monoclinic distortion that can be driven by both temperature and magnetic field.

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Xiaoshan Xu
University of Tennessee, Knoxville

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