

Abstract Submitted
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Robust charge and magnetic order in the multiferroic LuFe_2O_4 under an external electric field¹ GUANGYONG XU, JINSHENG WEN, GENDU GU, STEPHEN SHAPIRO, Brookhaven National Laboratory — We will discuss elastic neutron scattering measurements on the charge- and magnetic-ordered multiferroic material LuFe_2O_4 . An external electric field with strength up to 20 kV/cm applied at low temperature (~ 150 K), does not affect either the charge or magnetic structure. At higher temperatures (~ 360 K), the resistivity of the sample is low, and an electric current has been applied instead. A reduction of the charge and magnetic peak intensities has been observed when the sample is cooled with the current being applied. However, using resistance- and intensity-temperature curves, we found that the observation is entirely due to internal sample heating by the current, where the actual sample temperature is higher than that read by the thermal sensor. Our results suggest that the charge and magnetic order in LuFe_2O_4 are robust, and neither the current applied at high temperature nor the field at low temperature was able to break these orders.

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