

Abstract Submitted
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Critical magnetic scattering in geometric frustrated multiferroic LuMnO₃ SHINICHIRO YANO, BING LI, DESPINA LOUCA, Univ. of Virginia, YIMING QIU, JOHN COPLEY, NIST Center for Neutron Research — The coexistence of competing order parameters in the class of materials referred to as the multiferroics is of great interest. The hexagonal manganites $AMnO_3$ ($A = Y, Lu, Ho$ and Yb) with the $P6_3cm$ space group exhibit a ferroelectric transition, at very high temperatures, typically ~ 1000 K, while the antiferromagnetic transition, T_N , occurs at ~ 100 K. Earlier studies on $YMnO_3$ and $LuMnO_3$ using neutron scattering on single crystals showed that diffuse scattering is present around the forbidden nuclear (100) Bragg peak which corresponds to $Q=1.20 \text{ \AA}^{-1}$. Its intensity rises very sharply and drops just around T_N . We performed inelastic neutron scattering measurement on a powder sample of $LuMnO_3$ from 4 to 250 K using the DCS at NIST. Strong inelastic intensity, not due to magnon excitations, is observed at $Q=1.32$ and 2.50 \AA^{-1} . With cooling, the intensity gradually rises and reaches a peak around 100 K. Below, it drops drastically once the system orders. This kind of scattering is due to critical scattering arising from magnetic fluctuations above T_N . The $S(Q, \omega)$ is asymmetric suggesting that the Mn spin correlations are most likely 2-dimensional in nature.

Shinichiro Yano
Univ. of Virginia

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