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Electric Field Effect on the Magnetic Order in Multiferroic $LuMnO_3$ CHUNRUO DUAN, JUNJIE YANG, Univ of Virginia, LELAND HARRIGER, NIST Center for Neutron Research, DESPINA LOUCA, Univ of Virginia — $LuMnO_3$ belongs to the family of hexagonal multiferroics in which ferroelectric and magnetic orders coexist and compete. The Mn^{3+} ions reside on a triangular lattice that is geometrically frustrated but undergoes a Neel transition at T_N ~90 K. Neutron experiments under electric field were carried out on a single crystal of $LuMnO_3$ at SPINS to investigate the coupling of the electric field to the magnetic order. The elastic and inelastic scattering around the commensurate (101) magnetic peak and the Mn trimerization induced (100) peak with and without electric field were investigated. When applying an E-field of 13.3 kV/cm along the (001) direction on an unpoled sample, an increase in (101) peak as well as a shift of the inelastic excitation near (100) to higher ΔE have been observed. Once the sample is polarized, these effects exist without the field. On the other hand, an E-field along (110) direction shows almost no effect. The spin arrangement of the magnetic order is within the ab-plane, thus the Dzyaloshinskii-Moriya interaction explains why a polarization perpendicular to the magnetic moment gives a larger effect. The implication will be discussed.

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