Crystal and Magnetic Structure of LuFeO$_3$
Ferroelectric

Unpolarized

Polarized by an applied electric field.
Magnetism
**LuFeO\(_3\)**

- LuFe\(_{75}\)Mn\(_{25}\)O\(_3\)
- \(T_{Curie}\) : \(~1050K\)
- Controversial discovery by ORNL\(^1\)
  - \(T_{Neel}\) : \(~440K\)
- What it should be (following YMnO\(_3\), HoMnO\(_3\))
  - \(T_{Neel}\) : \(~130K\)

\(^1\)Wenbin Wang et al., Phys Rev. Lett 110, 237601 (2013)
Crystals
WebRefine

- Priyanka Patel (Poolesville)
## Visitors

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Tracking began on Aug 05, 2013 @ 8:45:14 a.m.
BT-1, BT-7, the Data Collectors
Fullprof

- Profile Refinement
Fullprof (cont)

- Simulated Annealing
Fullprof (cont)

- Refinement

LuFep001  CELL:  5.99492  5.99492  11.63771  90.0000  90.0000  120.0000  SPGR: P 63 c m
BLAND

- Goes through a range of values for each parameter to find the parameter that minimizes chi-squared value
Fitted curves of the 200K and 20K data, with the crystal and magnetic structures that correspond to the fitted curves. The atoms were removed in the second structure to display the magnetic structure more clearly.
Most Updated Crystal/Magnetic Struc.
Acknowledgments

- Dr. William Ratcliff, my mentor
- Center for High Resolution Neutron Scattering (CHRNS), sponsor of NCNR SHIP
- Dr. Julie Borchers, Dr. Yamali Hernandez, coordinators of NCNR SHIP
• Dylan Quintana, the *bland* programmer
Sources

