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## Emergent ferromagnetic correlations and spin textures in the chiral magnet BaFeGaO<sub>4</sub>

Topological spin textures in solids are of great interest for future spin-electronic technologies. Recent studies of chiral cubic materials hosting skyrmions—such as the itinerant magnets MnSi and FeGe and the Mott insulator Cu<sub>2</sub>OSeO<sub>3</sub>—have shown that they exhibit a common set of magnetic phases characterized by long-period spin modulations and undergo similar field-induced transitions. Here, we investigate the structural and magnetic properties of BaFeGaO<sub>4</sub> using x-ray diffraction, neutron diffraction, and magnetic measurements. BaFeGaO<sub>4</sub> crystallizes in the hexagonal crystal system with space group P6<sub>3</sub>. Magnetic susceptibility measurements performed at fields of 0.01 and 1 T reveal an inflection point near T≈50K, indicating a magnetic phase transition. Magnetic hysteresis observed at T=2K suggests the development of ferromagnetic behavior. Neutron diffraction measurements on powder samples show no additional magnetic Bragg peaks down to 2 K; however, a slight enhancement in intensity superimposed on the nuclear reflections indicates the presence of weak ferromagnetic correlations and potentially novel spin textures in this system.

### Academic or Professional Status

Graduate Student

**Author:** DELGADO, Orrin (Norfolk State University)

**Co-authors:** Dr TEMPLE, Doyle (Norfolk State University); Dr KARNA, Sunil (Norfolk State University); Mr WANG, Chin-Wei (Australian Nuclear Science and Technology Organisation)

**Presenter:** DELGADO, Orrin (Norfolk State University)

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