

New Multiferroics: GaFeO<sub>3</sub> and BaFe<sub>12</sub>O<sub>19</sub>

**J. F. Scott**

Depts. of Chemistry and Physics  
St. Andrews University  
St. Andrews, Scotland KY16 9ST

I will discuss new work on multiferroic switching in GaFeO<sub>3</sub> up to T = 410K. This is a ferromagnet with 0.3 Bohr magnetons per unit cell net magnetization and large (>20 macrocell/cm<sup>2</sup>) polarisation. It is rather low-loss at room temperature and can be made as epitaxial films and single crystals. I will also discuss Quantum Critical Point studies (QCPs) in the multiferroic hexaferrites BaFe<sub>12</sub>O<sub>19</sub>, SrFe<sub>12</sub>O<sub>19</sub>, and PbFe<sub>3</sub>Ga<sub>9</sub>O<sub>19</sub>. These are the most profitable commercial magnetic devices (3 billion euros/year) and used for magnetic stripe credit cards. They all exhibit ferroelectric QCPs with d=5 dimensionality and electric susceptibility temperature exponent 3.0; and the mixed Fe/Al compound exhibits a magnetic QCP.