

## Orthorhombic LuMnO<sub>3</sub> thin films, a multifunctional multiferroic

*Thursday, 19 September 2013 11:05 (30 minutes)*

Materials featuring the co-existence of coupled magnetic and ferroelectric order allow the switching of magnetic moments by an electric field and vice versa. Experimentally, only a few multiferroic materials are known to be ferromagnetic, with the large majority being antiferromagnetically ordered. We studied thin films of orthorhombic LuMnO<sub>3</sub>, a material which is known to exhibit magnetically-induced ferroelectricity with an E type antiferromagnetic groundstate. In single crystalline like thin films grown by pulsed laser deposition on YAlO<sub>3</sub> substrates, we identify co existing and coupled ferromagnetic and antiferromagnetic orders. The ferromagnetism is located in a layer close to the substrate-film interface and extends over  $\sim 10$  nm with a constant magnetic moment of  $\sim 1\mu\text{B}$ , subsequently falling off towards the film surface. This single phase material with coupled ferro-, antiferromagnetic orders thus represents an important step towards a future utilization of multiferroic materials in spintronic device with a built-in exchange bias.

**Primary author:** Dr SCHNEIDER, Christof (PSI)

**Presenter:** Dr SCHNEIDER, Christof (PSI)

**Session Classification:** Functional Materials