



Walther-Meißner-Institut

Bayerische Akademie der Wissenschaften



Walther-Meißner-Seminar

Walther-Meißner-Institut, Seminar Room 143

Date: Friday, 10 March 2017, 13:30 h

Speaker: Dr. Danny Mannix

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Title: X-Ray and Neutron Scattering Studies of Iridate Thin Films

Abstract:

The iridates are currently of high scientific interest due to the unique interplay of strong spin-orbit effects, which opens up a narrow bandgap in a material that would otherwise be metallic. Since the 5d orbitals are much more extended than those of the 3d and 4d states, iridate insulators are expected to be highly sensitive to external perturbations, such as epitaxial strain. Therefore, iridate oxides represent particularly interesting materials for thin epitaxial film research, where strain could play a role to tailor particular physical properties or stabilize new physical states. Indeed, strain engineering has been recently demonstrated to tune the magnetic coupling [1], modify the electronic states [2] and induce giant piezoresistive behaviour [3] in Sr_2IrO_4 thin epitaxial films. In this talk, detailed X-Ray Resonant Scattering results on Sr_2IrO_4 thin epitaxial films will be presented, including in applied magnetic fields. This work finds long-range magnetic order in the films, as apposed to previously reported short range order [1]. Experiments in applied magnetic fields identify a hysteresis in the magnetic structure at low temperature, which appears to be related to the epitaxy of the film with the substrate. Polarised Neutron Reflectivity measurements consistent with a ferromagnetic component of the magnetic structure, will also be discussed.

References:

- [1] A. Lupascu et al. Phys. Rev. Lett. 147201 (2014).
- [2] J. Nichols et al. Appl. Phys. Lett. 102 14108 (2013).
- [3] N. Domingo et al. Nanoscale 87 3453 (2015).