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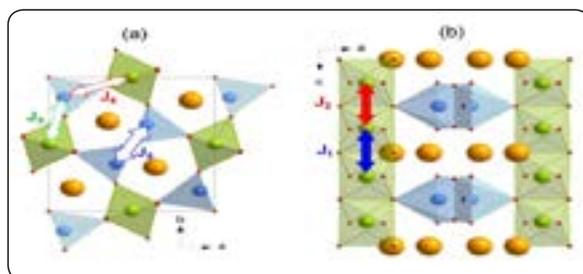
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New insight in the physics of RMn_2O_5 multiferroics

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RMn_2O_5 materials have long been presented as spin induced multiferroic family, where the electric polarization develops concomitantly with a magnetic transition at low temperature. The complex magnetic order originates from the frustration of anti-ferromagnetic loops of 5 sites in the (a,b) plane as illustrated in the Figure. What makes them particularly interesting lies in their singular properties: an electric polarization among the strongest reported so far ($3600\mu\text{C}\cdot\text{cm}^{-2}$ in GdMn_2O_5), a strong magneto-electric coupling (enabling a polarization flip under a magnetic field of 2T in TbMn_2O_5), and a magnetism that indicates a different fundamental mechanism than the standard Dzyaloshinskii-Moriya Interaction. In this presentation, I will present our recent results on both atomic and magnetic structures of several members of this family, shedding a new light on the physic and problematic of RMn_2O_5 .



Recent Publications

1. S Chattopadhyay et al. (2017) 3d- 4f coupling and multiferroicity in frustrated Cairo pentagonal oxide DyMn_2O_5 , Scientific Report.
2. W Peng et al. (2017) Toward pressure- induced multiferroicity in PrMn_2O_5 , Physical Review B. 96:054418.
3. G Yahia et al. (2017) Recognition of exchange striction as the origin of magnetoelectric coupling in multiferroics. Physical Review B. 95:184112.
4. S Chattopadhyay et al. (2016) Evidence of multiferroicity in NdMn_2O_5 , Physical Review B. 93:104406.
5. V Balédent S et al. (2015) Evidence for room temperature electric polarization in RMn_2O_5 Physical Review Letters. 114:117601.

Biography

Victor Balédent obtained his PhD (Physics) in 2010 for his work on the magnetic properties of superconducting cuprates studied by neutron scattering, awarded by a prize from the French Neutron Society. During a two years Postdoc at synchrotron SOLEIL, he extend his research to various superconducting materials (pnictides, heavy fermions, cuprates) and widens his scientific thematics to metal-insulating transitions and multiferroicity. He is currently an Associate Professor at the University of Paris Sud, Orsay, France. He was recruited as an Assistant Professor in 2013 at the Laboratory of Solid Physics, Orsay, France. His research focus on the manifestation of electronic correlations in physical properties in several classes of material from Mott-insulators and superconductivity through multiferroics. Techniques used are neutron and X-ray elastic and inelastic scattering with different sample environment : high pressure, magnetic field and low temperature.

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