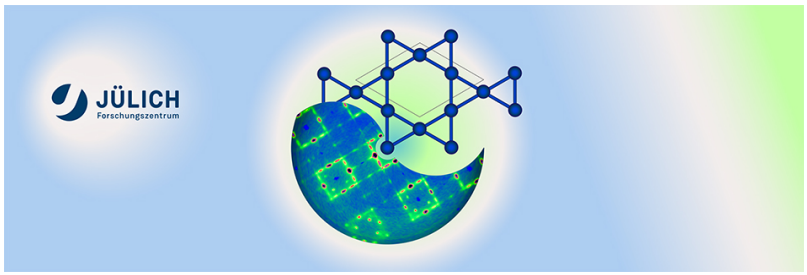

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Unconventional orderings in pyrochlore ruthenates

Mittwoch, 8. Oktober 2025 08:30 (30 Minuten)

Pyrochlore oxides of formula R2M2O7, made of two interpenetrated pyrochlore lattices, are a rich playground in frustrated magnetism to stabilize unconventional magnetic phases, among which classical and quantum spin ice states or dipolar-octupolar phases [1-3]. When the M site is occupied by a magnetic atom such as iridium, it was shown that new magnetic states called fragmented states can emerge [4-6]. These states are characterized by the coexistence of a spin liquid phase and an ordered phase, carried by a single degree of freedom, which manifests by the presence of both magnetic Bragg peaks and diffuse scattering in neutron scattering patterns.
In this talk, I will focus on the case where the M site is occupied by another magnetic atom, ruthenium. The ruthenium sublattice orders in the 100 K range in an easy plane antiferromagnetic structure, very different from the so-called “all in - all out” state stabilized by the iridium ion. I will show how this ordering affects the magnetic rare earth properties in the cases where R=Ho, Dy, Nd. It includes the discovery of a ferromagnetic fragmented state [7], and of unconventional dipolar-octupolar couplings.

[1] J. Gardner et al., Rev. Mod. Phys. 82, 53 (2010).
[2] M. Gingras et al., Rep. Prog. Phys. 77, 056501 (2014).
[3] E. Smith et al., Ann. Rev. Condens. Matter Phys. 16, 387 (2025). [4] M. Brooks-Bartlett et al. Phys. Rev X 4, 011007 (2014).
[5] E. Lefrançois et al., Nature Commun. 8, 209 (2017).
[6] V. Cathelin et al., Phys. Rev. Research 2 , 032073(R) (2020).
[7] F. Museur et al., arXiv:2411.10078.

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