

Unconventional magnetization processes and thermal runaway in spin-ice Dy₂-Ti₂O₇

Grigera, S.A.¹

¹*IFLYSIB (Argentina) University of St Andrews (UK)*

Spin ice is a deceptively simple frustrated system. Composed of Ising spins on the vertices of a pyrochlore lattice with ferromagnetic interactions, it has a ground state formally equivalent to that of protons in the eponymous water ice.

In this talk I will briefly discuss some non-equilibrium effects in the magnetisation process of spin-ice. Magnetisation is increased through the propagation of monopolar excitations of opposite sign. Because these are gapped and have long-range attractive interaction, they act as a reservoir of Zeeman energy. As the magnetic field is increased, this energy builds up, and depending on additional conditions, such as the bath temperature, thermal conductivity and sweep rate, they can either relax through a normal combustion -analogous to gently charring a paper - or in a very sudden fashion -the magnetic analogue of deflagration of a combustible material.