

## CONDENSED MATTER SEMINAR

Thursday 25 January at 14:30

Simpkins Lee room

**“Emergent quantum coherence in random magnets allows to probe slow quantum dynamics”**

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Local excitations in magnetic materials are usually expected to be highly incoherent, since they dephase very quickly due to mutual interactions. However, there are interesting exceptions to this common lore. Our joint experimental and theoretical study of the random rare-earth magnet  $\text{LiY}_{1-x}\text{Tb}_x\text{F}_4$  reveals that a combination of hyperfine interactions, external magnetic fields and substantial disorder allows excitations on pairs of Tb sites to retain coherence for remarkably long times, as they can be well shielded from the dominant decoherence channels. The remaining decoherence turns out to probe the slow dynamics in the neighborhood of these degrees of freedom, which thus act as quantum sensors. This is particularly interesting as a means to probe the nearly many-body localized dynamics of strongly disordered dipolar magnets.