

Slow Magnetic Relaxation in an Fe-based Coordination Polymer

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Coordination polymers are a very flexible platform for achieving low-dimensional magnetic systems. In this talk, we investigate the magnetic properties of one such iron-based coordination polymer, ICR-3. Doubly oxygen-bridged Fe chains form below a structural phase transition at $T \sim 120$ K. Mössbauer spectroscopy, DC and AC magnetometry experiments show slow relaxation of magnetization at $T < 16$ K. DFT+U calculations in WIEN2k and VASP show uniaxial magnetocrystalline anisotropy of $D \sim 25$ K, negligible inter-chain exchange and modest ferromagnetic intra-chain exchange interactions, suggesting ICR-3 is a single-chain magnet.

Superfluid Helium (^4He) Quantum Interference Device (SHeQUID)

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The Josephson effect, typically observed in weakly coupled superconductors, also manifests in superfluid helium due to the profound similarities between these two quantum systems. Although this phenomenon is most commonly utilized to build superconducting quantum interference devices (SQUIDs), it is entirely possible to construct these precise sensors using superfluids instead. This presentation introduces the fundamental physics and architecture of these superfluid devices. I will present the latest progress regarding the development of the superfluid helium QUID currently being constructed in our laboratory and outline the next steps towards completion of this project in the near future.