

# 825<sup>th</sup> ASRC Seminar

**Date:** August 1 (Mon), 13:30 ~ 15:00

**Location:** Lobby(2F) of ASRC bldg. & Online via Zoom

**Speaker:** Dr. Joseph Barker

(School of Physics and Astronomy, Univ. of Leeds)

**Title:** Quantitative calculation of magnetic materials  
with atomistic spin dynamics

## Abstract:

Atomistic spin dynamics is a formalism based on the Heisenberg Hamiltonian and the Landau-Lifshitz-Gilbert equation of motion. It has been used extensively for studying thermal and non-equilibrium behaviour in regimes where micromagnetism cannot be used. However, as a classical formalism it has long been known not to reproduce the correct 'low temperature' properties of magnets. We have recently addressed this by implementing a quantum thermostat within the formalism, resulting in a model where the spin magnetic moments are still classical vectors but the excitations (magnons) have a Bose-Einstein thermal distribution. We show that this now gives agreement with low temperature results from theory as well as experimental measurements up to the Curie point. This includes the temperature dependence of magnetisation, magnon spectra and exchange stiffness. State of the art, quantitative modelling of the magnetic insulator yttrium iron garnet from ab initio upwards will be demonstrated.

<Contact for Zoom URL>

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