

CONDENSED MATTER PHYSICS SEMINAR

Thursday 23 October at 14:30

Simpkins Lee Seminar Room, Department of Physics

(<https://maps.app.goo.gl/WjG71uLF2D48n85B6>)

Nanocalorimetry for quantum materials: from steady-state to frequency-domain

Professor Andreas Rydh

Stockholme University

Specific heat is a direct probe of low-energy excitations, positioned to capture both the electronic density of states and the scaling of quantum-critical fluctuations in strongly correlated materials as functions of temperature, magnetic field, and orientation. In this seminar, I will introduce our nanocalorimetry platform for high-resolution measurements at low temperature and in strong magnetic fields. I will also describe our recent extension of the technique from steady-state measurements to frequency-domain calorimetry (“thermal impedance spectroscopy”). This dynamic approach enables concurrent extraction of spin–lattice relaxation time T_1 and specific heat of both the nuclear and electron–phonon subsystems. I will illustrate with recent results on the heavy-fermion superconductor CeCoIn_5 , comparing the indications of quantum criticality from specific heat and $1/(T_1T)$. I will also discuss a compact quantum-critical scaling description of the specific heat of quasicrystalline Yb–Au–Al .