Physical Sciences Seminar

Linear and Nonlinear Responses in Quantum Magnets (Quantum Colloquium)

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Host: Zhanybek Alpichshev

Quantum materials represent a broad class of systems whose experimental response relies on uniquely quantum aspects such as entanglement, Berry phases, and electronic correlations. Modeling of such materials presents challenges related to a variety complex behaviours that manifest at different energy scales. In this field, first-principles approaches often provide a vital bridge between experiments and theoretical models. In this talk, I will introduce our numerical strategies for systematically building low-energy models with local charge, spin, and orbital degrees of freedom of arbitrary complexity. I will discuss the insights that these methods have yielded for frustrated Co(II)-based magnetic insulators and layered vdW materials, in which spin-orbit coupling induces strongly anisotropic and competing magnetic interactions. I will also discuss preliminary work on extending these methods to treat (i) spin-lattice coupling, and (ii) dynamical effective Hamiltonians for modeling non-linear responses in quantum materials, and the breadth of opportunities for non-linear spectroscopy.

Tuesday, January 9, 2024 11:00am - 12:00pm
Office Bldg West / Ground floor / Heinzel Seminar Room

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.