



TECHNISCHE  
UNIVERSITÄT  
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## Physics Colloquium

TU Wien

28. April 2025

Recent advances in artificial spin ice

Laura Heyderman

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Artificial spin ices are arrays of coupled nanomagnets arranged on various lattices with frustrated magnetic configurations, with each lattice geometry bringing its own fascinating physics.

I will present our work in the following three areas:

- (i) Phase Transitions
- (ii) Nanomagnetic Computation
- (iii) Three-Dimensional Lattices

This work requires the development of nanofabrication methods, characterization with lab-based and large scale facilities, and simulations.

### VERANSTALTUNGSORT

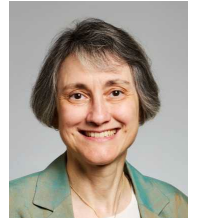
TU Wien, Freihaus,  
Hörsaal 5 (DA02G15), 2. Stock, grüner Bereich  
Wiedner Hauptstraße 8-10  
1040 Wien

### VERANSTALTUNGSZEIT

17:00 Uhr c.t.

Ab 18:00 wird es ein Buffet geben.

Laura Heyderman is a Professor of Mesoscopic Systems at the Department of Materials, ETH Zurich. She has also served as Head of the Laboratory for Multiscale Materials Experiments at the Paul Scherrer Institute. In



her research, she develops lithography methods for fabricating structures and devices incorporating sub-micrometre magnets. Her work also includes the development of novel large-scale facility methods for characterising their microscopic behaviour. A key focus is artificial spin ice—arrays of coupled frustrated magnets arranged on various lattices. These magnetic metamaterials exhibit intriguing phenomena, including emergent magnetic monopoles, chiral dynamics, and phase transitions. Additionally, she investigates three-dimensional magnetic systems, magneto-mechanical systems, hybrid materials, and spintronic devices, laying the groundwork for next-generation technologies such as sensors, actuators, micromanipulators and computation.

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