

## ANNOUNCEMENT - TALK

**Title: Emergent functionality in nanosculpted quantum material devices**


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## Abstract

A wide range of quantum materials exhibit emergent electronic and magnetic phenomena with significant potential for novel functionality. Focused ion beam (FIB) fabrication provides a flexible route to engineer devices and experimental geometries directly from these single crystals, enabling access to regimes that are often difficult to realise using conventional device approaches. In this talk, I will discuss the development and application of FIB-based device fabrication approaches at RIKEN used to investigate a range of quantum materials and functionalities, including skyrmion dynamics, p-wave magnetism, and time-reversal symmetry breaking antiferromagnets. I will then present our recent development of three-dimensional nanosculpted devices, focusing on helical structures fabricated from the high-mobility Weyl ferromagnet  $\text{Co}_3\text{Sn}_2\text{S}_2$ . By introducing inversion symmetry breaking on the length scale of the electron mean free path, these structures exhibit large nonreciprocal transport effects, resulting in a switchable zero-field diode response. More broadly, these results demonstrate how nanoscale geometric design can be used to access emergent electronic functionality in quantum materials.

 **mqm - Seminar**



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Location: **MPSD 900.EG.136**  
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