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Polarized neutron diffraction at DEMAND (HB-3A)

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Understanding the interactions leading to magnetic quantum phenomena in a wide range of quantum materials is important for development of new quantum materials and future technologies. Quantifying these interactions and the resultant magnetic matter in quantum materials that exhibit exotic matter such as quantum spin liquids, topological insulators, and Weyl semimetals, is currently being limited by a range of challenges including the lack of sizable crystals, limited sample environment conditions, and the ability to disentangle the intrinsic quantum phenomena versus effects from defects and site-disorder. Polarized neutron diffraction could play an important role in exploring magnetic matter and interactions. We recently upgraded the HB-3A four-circle diffractometer by installing a large area position sensitive detector and integrated a set of extreme sample environment equipment for quantum material study purpose and renamed the HB-3A as DEMAND (Dimensional Extreme sample environment Magnetic Neutron Diffractometer). In this presentation, we will focus on the polarized neutron diffraction capabilities recently developed at DEMAND, which used both the S-bender supermirror and the He-3 polarizers that are still under development.

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Summary

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