

Abstract Submitted  
for the 4CS20 Meeting of  
The American Physical Society

**Exploring the Rich Physics of Triangular Lattice Antiferromagnets with Neutron Scattering** BENJAMIN FRANDBSEN, RAJU BARAL, Brigham Young University, HAIDONG ZHOU, University of Tennessee, Knoxville, ZHILING DUN, MARTIN MOURIGAL, Georgia Institute of Technology — In geometrically frustrated magnets, the spatial arrangement of magnetic moments on a lattice prevents competing magnetic interactions from being simultaneously satisfied, often leading to exotic magnetic behavior. The canonical example of geometrical frustration consists of antiferromagnetically coupled spins populating a triangular lattice. Here, we explore the compound  $\text{TmMgGaO}_4$ , which hosts Ising-like  $\text{Tm}^{3+}$  magnetic moments on a perfect triangular lattice. Using magnetic pair distribution function analysis of neutron scattering data, we study the short-range magnetic correlations present at low temperatures. The results suggest a surprising connection to a topological Kosterlitz-Thouless transition at low temperature, showcasing the rich behavior observed in geometrically frustrated magnets.

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Date submitted: 25 Sep 2020

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