WORKSHOP #3

Correlated Topological Materials for Quantum Information Sciences

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Searching a proper quantum material that can host a qubits for universal topological quantum computing has been a long-standing challenge. Topological superconductors and quantum spin liquids represent two promising materials classes with long-range entanglement and fractionalized excitations. However, despite intensive research effort, there has been only a handful of materials' candidates available with elusive experimental signatures. This Workshop aims to introduce the latest progress on quantum computing based on correlated topological materials, with a focus on the nontrivial topological features in emergent topological materials. A few imminent key challenging problems will be addressed, and our long-term vision is the bridge toward universal quantum computing beyond the noisy intermediate-scale quantum regime. The workshop will bring together scientists in the field of X-ray scattering, quantum information sciences, and quantum materials to tackle the grand challenge together.

Start Time (ET)	Title	Speaker (Affiliation)
9:00 – 9:30 a.m.	Welcome remarks & beamline capability	Steve Hulbert, Christie Nelson, Xiaoqian Chen
9:30 – 10:00 a.m.	Topology: From Material Classification to Interacting Flat Bands	Andrei Bernevig
10:00 – 10:30 a.m.		Ho Ngyun Lee
10:30 – 11:00 a.m.	Strong correlations boost topological response in a Weyl semimetal	Silke Buehler-Paschen
11:00 – 11:30 a.m.	Magnetic order in topological metals and semimetals	Andrew Boothroyd
11:30 – 11:35 a.m.	VENDOR FLASH TALK	
11:35 – 12:05 p.m.	Magnetic Excitations in α-$RuCl_3$	Stephen Nagler
12:05 – 12:25 p.m.	LUNCH BREAK	
12:25 – 12:55 p.m.	Scattering studies of the charge density wave state in AV3Sb5 (A=K, Rb, Cs)	Stephen Wilson
12:55 – 1:00 p.m.	VENDOR FLASH TALK	
1:00 – 1:30 p.m.	Emergence of spinons in layered trimer iridate Ba4Ir3O10	Mark Dean
1:30 – 2:00 p.m.	Magnetic Excitations and Interactions in the Honeycomb Antiferromagnet BaCo2(AsO4)2	Collin Broholm
2:00 – 2:30 p.m.	Emergent phases in geometrically frustrated lattices	Ming Yi
2:30 – 3:00 p.m.	Magnon Pairing, Interactions, and Decay in the Spin-orbital Magnet FeI2	Martin Mourigal

3:00 – 3:30 p.m.	Optical detection and manipulation of spontaneous gyrotropic electronic order	Qiong Ma
3:30 – 4:00 p.m.	Topological Magnons: The Gateway to Magnonics Computing	Sara Haravifard
4:00 – 4:05 p.m.		Closing Remarks