

## Condensed Matter Seminar

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### “Inversion-protected Majorana Corner Modes: A Case Study of Super Conducting Monolayer WTe<sub>2</sub>”

Monday, February 22, 2021

4:00pm – 5:00pm

Virtual Meeting:

**Zoom Link:** <https://virginiatech.zoom.us/j/83960080252?pwd=aTFpN1dmbHNWV0VnYUNrN3pNY2lScz09>

**Passcode:** 131300

Monolayer WTe<sub>2</sub>, an inversion-symmetric transition metal dichalcogenide, has recently been established as a quantum spin Hall insulator and found superconducting upon gating. It is therefore natural to wonder whether this discovered super conductivity is topological. In this talk I will first show that gated monolayer WTe<sub>2</sub> in fact satisfies a general recipe we find for an inversion-protected “higher-order” topological superconductor. Such a class of 2D superconductors feature Majorana corner modes. Then I will present numerical results demonstrating that corner Majoranas indeed appear through out the WTe<sub>2</sub> superconducting phase diagram self-consistently. Finally, I will discuss the bulk-boundary correspondence and present topological invariants that can diagnose the type of Majorana boundary modes from ab initio band structures. Our topological invariants could guide future material search for more candidate superconductors hosting corner Majoranas without utilizing proximity effect.