

Massachusetts Institute of Technology  
Department of Physics

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Condensed Matter Theory Seminar

"Spectroscopy of spinons in Coulomb quantum spin liquids"

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**Abstract:** Quantum spin liquids are phases of matter with fractionalized excitations and emergent gauge fields. However, there is a lack of concrete experimental signatures for these exotic features. We compute the low-temperature dynamics of fractionalized spinon excitations in the prominent class of U(1) Coulomb spin liquids such as quantum spin ice. The emergent photon is gapless and hence has a dramatic effect on the threshold cross-section of spinons, changing the weak turn-on expected from the density of states to an abrupt onset reflecting the emergent fine structure constant. The photon is also extremely slow in all existing models and materials. This leads to a suppression of the intensity at finite momentum and emission of Cerenkov radiation beyond a critical momentum. These features are broadly consistent with recent numerical and experimental results.

**12:00pm noon**  
**Tuesday, October 15, 2019**  
**Duboc Room (4-331)**