

DEPARTMENT OF PHYSICS & ASTRONOMY  
**CONDENSED MATTER SEMINAR**

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**Entanglement Entropy, Quasiparticle  
Fluctuations and Thermal Entropy in  
Topological Phases**

Entanglement entropy in topologically ordered matter phases has been computed extensively using various methods. In this talk, we study the entanglement entropy of 2D topological phases from the perspective of quasiparticle fluctuations. In this picture, the entanglement spectrum of a topologically ordered system encodes the quasiparticle fluctuations of the system, and the entanglement entropy measures the maximal quasiparticle fluctuations on the entanglement boundary. As a consequence, entanglement entropy corresponds to the thermal entropy of the quasiparticles at the infinite temperature on the entanglement boundary. We corroborate our results with explicit computation in the quantum double model with/without boundaries. We then systematically construct the reduced density matrices of the quantum double model on generic 2-surfaces with boundaries.

**Special Seminar**  
**Wednesday, August 28, 2019**  
**JFB 334**  
**3:30 pm**

Refreshments will be served in JFB 334 at 3:15 pm