

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Finite Temperature SP Topological Order & Long-range Topological Superconductivity"

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Abstract: I will introduce the topological Ullmann phase as a tool to characterise density matrices of 1D and 2D topological insulators and superconductors at finite temperature. New effects appear such as the existence of critical temperatures, novel thermal-topological transitions in models with high Chern numbers, etc. An experimental protocol to measure this new topological phase will be presented.

In the second part of the talk, I will analyse a generalisation of the 1D Kitaev chain modified by long-range effects. For power-law decaying superconducting pairing, massless Majorana modes at the edge pair together into a new topological quasiparticle: a massive Dirac fermion localised at both edges of the chain. This new topological phase has fractional topological numbers as a consequence of the long-range couplings. Possible applications to current experimental setups, disorder analysis and topological quantum computation applications will be also discussed.

12:00pm
Wednesday, September 28, 2016
Duboc Room (4-331)