

Eric Rowell (Texas A&M University)

Topological Quantum Computation

Two-dimensional topological states of matter offer a route to quantum computation that would be topologically protected against the nemesis of the quantum circuit model: decoherence. In this talk I will give a mathematicians' perspective on some of the advantages and challenges of this model with an emphasis on the role of topological quantum field theory and braid group representations. I will discuss several foundational problems in computer science/condensed matter, their mathematical formulations and some recent results we have obtained. Time permitting I will introduce a new approach using 3-dimensional media.