

Topological Quantum Computing

Dear Physics Society members,

As mentioned in previous email, we are going to have a talk on "**Topological Quantum Computing**" on **Saturday, April 14th 2018 at 4 PM**. There has been lately a huge trend on Quantum computing with ideas coming from Quantum Mechanics, Computer Science and Pure Mathematics. We will try to follow up on these ideas by reviewing recent work on the field especially.

The structure of the talk will be:

1. A short introduction to Quantum Mechanics
2. Introduction to Quantum Computing and why is it superior than Garden Variety Computing (<https://arxiv.org/abs/0708.0261>)
3. Introduction to Topology (Geometry, Topology and Physics by Nakahara)
4. Hamiltonian, Topology and Symmetry
5. Abelian and Non-abelian anyons (<https://arxiv.org/abs/1610.09260>)
6. Majoranas zero mode in Kitaev Chain (<https://arxiv.org/abs/cond-mat/0010440>)
7. Why Majoranas are cool? Because they braid and do topological quantum computation
8. Discussions

The basic idea is that "While Quantum computers are theoretically able to do superior computation, it is very difficult to make one due to quantum decoherence effect. One idea to solve it is by making qubit topological such that local decoherence won't be able to affect it. Majoranas zero modes are one of such qubits."

Since we will have audiences from all level, I will try to make the discussion as simple as possible without losing the gist away. Questions are very welcome.

See you!!

Sincerely,
Kiran Adhikari