

Topological quantum computers and modular categories

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Quantum computers can perform certain tasks, most notably factoring of integers, with significant lower complexity than classical computers. However, one faces many technical difficulties trying to build a quantum computer. One of the major problems is decoherence: interactions with the environment affect the calculation.

In this talk I will describe an alternative model for a quantum computer, which might solve the problem of decoherence. Namely, that of a topological quantum computer. In short, such a quantum computer would allow one to do calculations by braiding particles.

I will give a quick introduction to quantum computing, and indicate how a topological quantum computer works. It turns out that the structure of such a quantum computer can be elegantly described by a modular tensor category. In the last part of my talk I will discuss this connection. No prior of knowledge of any of the subjects is assumed.