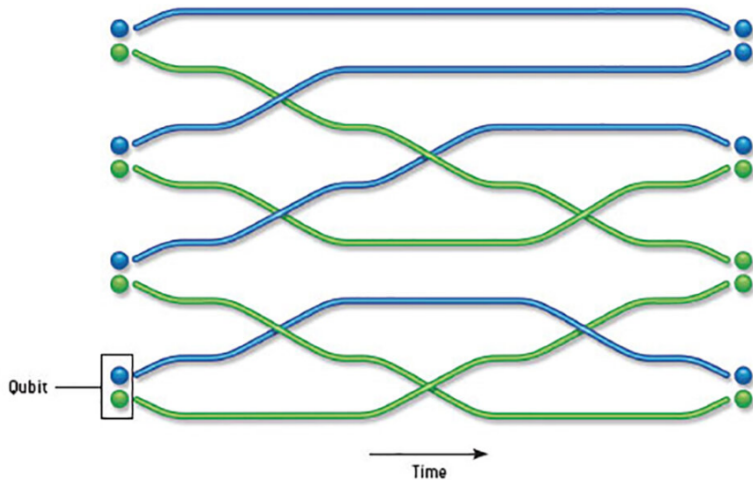# The mathematics of topological quantum computation

Andrew Schopieray
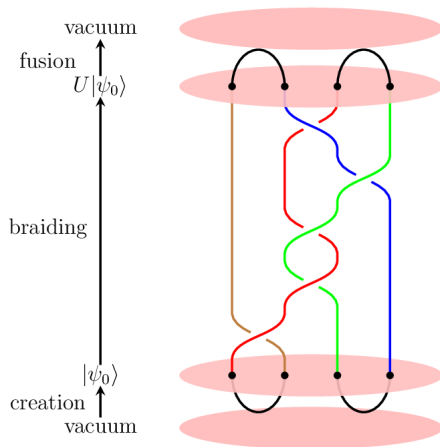
Quantum computation with anyons

Qubit

Time

Computing with Quantum Knots, Graham P. Collins, Scientific American 294, 56-63 (2006)
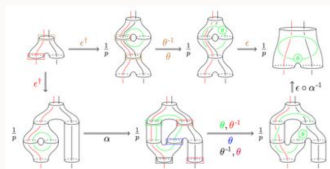
Quantum computation with anyons

Topological Quantum Computation, Shawn X. Cui, Stanford lecture notes (2018)

What do I do?

Physical model of anyons $\longleftarrow$ (modular) Fusion categories

The study of tensor categories involves the interplay of representation theory, combinatorics, number theory, and low dimensional topology (from a string diagram calculation, describing the 3-dimensional bordism 2-category [arXiv:1411.0945]).

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✉ p388@slmath.org

Simons Laufer Mathematical Sciences Institute webpage (2024)

For example, I produce...

Numerical invariants (measurements) based on 19th-century number theory

Higher Gauss sums of modular categories

Published: 19 August 2019

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Siu-Hung Ng, Andrew Schopieray & Yilong Wang ✉

…tools which are used by…

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Justin Kaidi, Zohar Komargodski, Kantaro Ohmori, Sahand Seifnashri, Shu-Heng Shao

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Pathways to fusion categories