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Quantum computation with Fibonacci anyons

Claire Levaillant
University of California at Santa Barbara, USA

Exotic particles named Fibonacci anyons have drawn increasing interest for topological quantum computation. Their specificity is the density of the braid group representations (Freedman-Larsen-Wang, 2001), that is any quantum gate can be approximated by braiding of the anyons, up to some arbitrary precision. In this talk, we show how adding measurement operations allow making some exact quantum gates probabilistically. From these probabilistic quantum gates, we derive exact ancillas, which we use in turn to make exact key quantum gates. Many recent theoretical studies have shown evidence for the existence of these exotic particles and have exhibited experimental platforms for their use. The field is vibrant on-going theoretical and experimental research in condensed matter physics.

Biography

Claire Levaillant graduated with a Ph.D. from California Institute of Technology in 2008. She has since then occupied visiting positions at Harish Chandra Research Institute in India and at the University of California at Santa Barbara in the USA. While in Santa Barbara she worked with the Microsoft Research Station Q team. She has authored papers in the fields of group theory and quantum computation.

clairelevaillant@yahoo.fr

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