MATHGRAD SEMINAR

The Basics of Measurement-Based Quantum Computing

By

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Abstract: In quantum computing quintessential quantum effects are harnessed to provide speedups over standard, or "classical" computers in certain computational tasks. Many conventional approaches to quantum computing utilize the so-called circuit model, which draws heavily on gate-based designs familiar from classical computation. An alternative to this standard model is Measurement-Based Quantum Computation (MBQC), an approach that instead takes full advantage of the peculiar features of quantum measurements. In this seminar we will discuss MBQC from a broad perspective that is suitable for an audience with only an exposure to circuit-based quantum computation. In particular, here we outline the basic premise of MBQC; briefly demonstrate its sufficiency for universal quantum computation; highlight some differences with the circuit-based model; and discuss its advantages. We close with some brief comments on the intimate connection of MBQC to foundational issues in quantum theory.

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