

CARLOS PEREZ, University of Waterloo, 200 University Ave. West, Waterloo, ON N2L 3G1
Models of Quantum Cellular Automata

In this talk we present a systematic view of Quantum Cellular Automata (QCA), a mathematical formalism of quantum computation. We present four QCA models, and compare them. One model we discuss is the traditional QCA, similar to those introduced by Shumacher and Werner, Watrous, and Van Dam. We discuss also Margolus QCA, also discussed by Schumacher and Werner. We introduce two new models, Coloured QCA, and Continuous QCA. We also compare our models with the established models. We give proofs of computational equivalence for several of these models. We show the strengths of each model, and provide examples of how our models can be useful to come up with algorithms, and implement them in real-world physical devices.