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Using quantum computers to test the consistency of quantum theory

Experimental tests of quantum theory have so far been restricted to microscopic scales. It is therefore unclear whether the theory accurately describes larger or more complex systems. In my talk, I will discuss a recent thought experiment that points to an inconsistency when one attempts to apply quantum theory to predict the behaviour of systems that are complex enough so that they can themselves use quantum theory to make predictions. I will

furthermore argue that, once universal quantum computers become available, this experiment can actually be carried out. Quantum computers are thus not only promising tools for fast data processing, but may also prove useful for research on the foundations of physics.

