

COLLOQUIUM OF THE INSTITUTE FOR QUANTUM INFORMATION SCIENCE 2:00 PM, FRIDAY, 17 JUNE 2005, IN SCIENCE B 146

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Title: **Optical quantum computing: science-fiction, horror-story or news?**

Abstract: Quantum computing requires massive nonlinear interactions between particles, which is notoriously difficult to achieve with photons. Consequently, there is a flurry of interest in the idea that optical quantum computing can be achieved by measurement-induced nonlinearity. Indeed, the first unambiguous experimental demonstration of quantum controlled-NOT gate operation, and the first complete characterisation of a quantum gate, have both been achieved optically. To achieve fault-tolerance, current schemes require horrific numbers of physical gates to implement just one logical gate. We highlight the benefits for our experimental program of recently proposed schemes that reduce requirements from the order of 10,000 to 50.

