

SEMINARIO
Departamentos de Física Teórica I y II
Universidad Complutense de Madrid

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TITULO: Building an optical quantum computer

LUGAR: FACULTAD DE CIENCIAS FÍSICAS UCM

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ABSTRACT

A quantum computer is a machine that would exploit the non-classical features of quantum systems, such as entanglement and superposition, and take advantage of the complexity of the many-particle quantum wavefunction to solve a computational problem. It will certainly not replace the classical computers sitting on our desks but will open the possibilities of performing computations we wouldn't be able to do otherwise. The focus of this talk will be Linear Optical Quantum Computing, the combination of the computation model of measurement-based quantum computation with on-chip photonic systems. The advantage of cluster state computation is that the entire resource with all its non-classical features is prepared offline, so that the computation is done by single-qubit measurements reducing the risk of the computation failing. Photonic systems are very promising as the technology for the implementation of this model as they have low-noise properties and high speed transmission. I will review the most relevant results in this topic before addressing the difficulties of the design of a full scale optical quantum computer.