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

**INVITADO**: Maarten van den Nest

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**TITULO**: **Quantum Computers: Potential and Limitations**

**LUGAR**: FACULTAD DE CIENCIAS FÍSICAS UCM
**DÍA**: 28 de noviembre, 2012 (Miércoles)
**HORA**: 14:30
**AULA**: Seminario Depto. Física Teórica I, Planta 3ª

**ABSTRACT**

Why do quantum computers outperform classical ones? Is this due to the exponentiality of the Hilbert space? the presence of entanglement? interference? non-commutativity? ... Understanding the relation between quantum and classical computation is a great challenge, both of fundamental and practical importance. In the field of classical simulations, the goal is to identify those quantum computations which can be simulated efficiently on a classical computer, and to understand which ingredients are responsible for the existence of such simulations.  In this talk I will discuss a selection of standard results and my own work in this topic. This includes e.g. the role of entanglement for quantum speed-ups, the surprising power of commuting quantum operations and the existence of classical simulations of the quantum Fourier transform.