



Instituto de Estructura de la Materia - Ciclo de Seminarios 2009-2010

**Seminario del
Departamento de Química y Física Teóricas**

**Why should Theoretical Physics care about
Quantum Computation?**

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The quest for a robust and stable quantum computer (QC) is a challenge in quantum information science and its construction will imply the discovery of new physics, like non-standard quantum phases of matter. We give an introduction to models of quantum computation with increasing degree of complexity aiming at the formulation of a self-correcting quantum computer. It turns out that certain types of gauge theories provide a candidate for the stabilization of QCs and the Higgs phase and confinement play a key role. Topological insulators are also examples of this framework and allow the simulation of high-energy phenomena not yet detected in particle physics. This seminar is a colloquium intended for a broad audience.

**Miércoles, 12 de Mayo de 2010
12:00 horas.**

*Sala de Conferencias
Centro de Física "Miguel A. Catalán".*

Serrano, 121. 28006 Madrid.