# Quantum Wonderland

**9:30~12:30, Wednesday, July 9, 2008**

**R203, 2F, NCTS, NCKU**

**9:30-10:30 Dr. Inaki Garay**

**(Instituto de Estructura de la Materia, CSIC, Madrid, Spain)**

**Title: Quantum Gravity effects in a system with cylindrical symmetry**


Abstract:

We perform the exact quantization of a gravitational system coupled to a massless scalar field with full cylindrical symmetry. Although the system is a symmetry reduction of General Relativity it has some residual diffeomorphism invariance and local degrees of freedom. These are two of the main features of General Relativity that lie at the heart of its non-renormalizability. Afterwards, we obtain geometric information about the quantized system by studying certain objects with direct spacetime interpretation. By doing this we observe some quantum gravity effects. For instance, the emergence of null geodesics, quantum gravitationally enhanced probability amplitudes... Finally, we show that it is impossible to construct coherent states for this model and obtain some quantitative results about the possibility of using the coherent states corresponding to a free theory as approximate semiclassical states for our system.


**10:30-11:00 break and discussion**

**11:00-12:00 Prof. Chopin Soo**

**(Dept. of Physics, NCKU)**

**Title: Geometry of quantum mechanics:**

**Geometric phases and their derivations**

**12:00-12:30 discussion**