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Seminar of the theory group of APC

Mardi 2 Avril 2019, 14 :00
APC, 646A - Mondrian
Domaines : gr-qc

Titre : *Testing Linearized quantum gravity in a laboratory*

Orateur : **Anupam Mazumdar (Van Swinderen (Institute University of Groningen))**

Résumé : *Understanding linearized aspects of gravity in the framework of quantum mechanics is one of the great challenges in modern physics. Along this line, a prime question is to find whether the linearized gravity is a quantum entity subject to the rules of quantum mechanics. Here, I will introduce an idea for such a test based on the principle that two objects cannot be entangled without a quantum mediator. We show that despite the weakness of gravity, the phase evolution induced by the gravitational interaction of two micron size test masses in adjacent matter-wave interferometers can detectably entangle them even when they are placed far apart enough to keep Casimir-Polder forces at bay. I will discuss the prescription for witnessing this entanglement, which certifies gravity as a quantum off-shell mediator, through simple correlation measurements between two spins : one embedded in each test mass. I will discuss how this experiment can place a potential constraint on the nature of gravity at short distances as well.*