

Entanglement Between Masses as a Probe of the Quantum Nature of Gravity

Thursday, 25 May 2017 12:00 (40 minutes)

Interactions between two material objects are mediated by fields. If quantum entanglement is created between two such objects due to their interaction, then it follows that the "mediating" field must have been a quantum entity. In this talk I first show that the states of two micrometer dimension test masses in adjacent matter-wave interferometers could be detectably entangled solely through their mutual gravitational interaction. I then argue that the purely gravitational mechanism for this entanglement implies that witnessing it is equivalent to certifying the quantum nature of the gravitational field that mediates the entanglement.

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