



Contribution ID: 100

Type: Plenary/Parallel talk

Quantum Mechanics of Gravitational Waves

In a series of papers with Maulik Parikh and Frank Wilczek we study the effect of a quantized gravitational wave on a LIGO-type gravitational wave detector. We find that the arm-length is subject to a stochastic tidal force whose properties depend on the exact quantum state of the gravitational field, if the gravitational field is quantized. The quantum nature of gravity may thus be detectable as an additional noise source at gravitational wave detectors.

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Session Classification: Poster session