Contribution ID: **1017** Type: **Parallel Talk**

Detecting quantum gravity in the sky

Friday, 7 July 2017 10:15 (15 minutes)

We show that the dimension of spacetime becomes complex-valued when its short-scale geometry is invariant under a discrete scaling symmetry. This characteristic can arise either in quantum gravities based on combinatorial or multifractal structures or as the partial breaking of continuous dilation symmetry in any conformal-invariant theory. With its infinite scale hierarchy, discrete scale invariance overlaps with the traditional separation between ultraviolet and infrared physics and it can leave an observable imprint in the cosmic microwave background. We discuss such imprint in the form of log oscillations and sharp features in the primordial power spectrum.

Experimental Collaboration

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Session Classification: Cosmology, dark energy, gravitational waves

Track Classification: Cosmology, Dark Energy, Gravitational Waves