

Fluctuations Of Spacetime And Holographic Noise In Atomic

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Fluctuations Of Spacetime And Holographic

On small scales spacetime can be understood as some kind of spacetime foam of fluctuating bubbles or loops which are expected to be an outcome of a theory of quantum gravity. One recently discussed model for this kind of spacetime fluctuations is the holographic principle which allows to deduce the structure of these fluctuations.

Fluctuations of spacetime and holographic noise in atomic ...

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(PDF) Fluctuations of spacetime and holographic noise in ...

Due to quantum fluctuations, spacetime is foamy on small scales. For maximum spatial resolution of the geometry of spacetime, the holographic model of spacetime foam stipulates that the uncertainty or fluctuation of distance l is given, on the average, by $(l \geq l_p) \frac{1}{3}$ where l_p is the Planck length. Applied to cosmology, it predicts that the cosmic energy is of critical density and the cosmic entropy is the maximum allowed by the holographic principle.

From spacetime foam to holographic foam cosmology ...

We also consider quantum fluctuations and their holographic properties in ADD model and estimate the typical size and mass of the clock to be used in precise measurements of spacetime fluctuations. Numerical estimations of phase incoherence of light from extra-galactic sources in ADD model are also presented.

About Quantum Fluctuations and Holographic Principle in (4 ...

We review the idea that the informational principle of minimal complexity determines a dual holographic bulk spacetime from a minimal quantum circuit U preparing a given boundary state from a trivial reference state. We describe how this idea may be extended to determine the relationship between the fluctuations of the bulk holographic geometry ...

Holographic fluctuations and the principle of minimal ...

In a recent paper we proposed that, generically, a theory of quantum gravity motivated by the holographic principle leads to fluctuations in the spacetime geometry that are measurable at macroscopic distances. Our reasoning was based on a number of steps.

Spacetime Fluctuations in AdS/CFT

Spacetime is composed of a fluctuating arrangement of bubbles or loops called spacetime foam, or quantum foam. We use the holographic principle to deduce its structure, and show that the result is consistent with gedanken experiments involving spacetime measurements.

SPACETIME FOAM | International Journal of Modern Physics D

We show that the holographic principle can be understood heuristically as originated from quantum fluctuations of spacetime. Applied to cosmology, this consideration leads to a dynamical cosmological constant Λ of the observed magnitude, in agreement with the result

obtained for the present and recent cosmic eras, by using unimodular gravity and causal-set theory.

[1610.06236] Holographic Theory of Gravity and Cosmology

Measurements of quasars at shorter, gamma-ray wavelengths with Fermi, and, shorter wavelengths with VERITAS rule out a second model, called a holographic model with less diffusion. Relation to other theories The vacuum fluctuations provide vacuum with a non-zero energy known as vacuum energy.

Quantum foam - Wikipedia

The Fermilab physicist Craig Hogan claims that the holographic principle would imply quantum fluctuations in spatial position that would lead to apparent background noise or "holographic noise" measurable at gravitational wave detectors, in particular GEO 600.

Holographic principle - Wikipedia

The holographic model enables a less turbulent spacetime compared with the random-walk model, which involves greater fluctuations. The team chose to analyze the quasar-like object PKS1413 + 135 to...

How foamy is spacetime? - Phys.org

First we cover the basic theory and motivation for holographic spacetime and move on to present the latest developments therein as of the time of this writing. Then we indicate the origin of the quantum degrees of freedom in the theory and then present a correspondence with low energy effective field theory.

Applications of Holographic Spacetime - INSPIRE

Space--time can be understood as some kind of space--time foam of fluctuating bubbles or loops which are expected to be an outcome of a theory of quantum gravity. One recently discussed model for this kind of space--time fluctuations is the holographic principle which allows to deduce the structure of these fluctuations.

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equations utilizing spherical Planck units in a generalized holographic approach. We consider vacuum fluctuations within volumes as well as on horizon surfaces, generating a discrete spacetime quantization and a novel quantized approach to gravitation. When

Quantum Gravity and the Holographic Mass

In previous work, we demonstrated that the subatomic nucleon structure of the proton and recently the electron can be derived directly from a spacetime holographic structure of Planck-scale quantum vacuum oscillators fluctuating as spacetime pixels, demonstrating that spacetime at the very fine level of the Planck-scale is discrete with information quanta.

Research Publications - Resonance Science

Quantum fluctuations of spacetime give rise to quantum foam, and black hole physics dictates that the foam is of holographic type. Applied to cosmology, the holographic model requires the existence of dark energy which, we argue, is composed of an enormous number of inert "particles" of extremely long wavelength.

Holographic foam, dark energy and infinite statistics ...

Abstract Due to quantum fluctuations, spacetime is foamy on small scales. The degree of foaminess is found to be consistent with the holographic principle. One way to detect spacetime foam is to look for halos in the images of distant quasars.

Spacetime Foam and Dark Energy: AIP Conference Proceedings ...

The Fermilab Holometer in Illinois is intended to be the world's most sensitive laser interferometer, surpassing the sensitivity of the GEO600 and LIGO systems, and theoretically able to detect holographic fluctuations in spacetime.. According to the director of the project, the Holometer should be capable of detecting fluctuations in the light of a single attometer, meeting or exceeding the ...

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