

## 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 ...

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  $(l l_P^2)^{1/3}$  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 ...

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 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

Applications of Holographic Spacetime by Terrence J. Torres Here we present an overview of the theory of holographic spacetime (HST), originally devised and primarily developed by Tom Banks and Willy Fischler, as well as its various applications and predictions for cosmology and particle phenomenology. First we cover

### Applications of Holographic Spacetime

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

This means the Holometer did not detect the amount of correlated holographic noise - quantum jitter - that this particular model of space-time predicts. But as Hogan emphasizes, that's just one theory, and with the Holometer, this team of scientists has proven that space-time can be probed at an unprecedented level.

### Holometer rules out first theory of space-time ...

When talking about gravitational wave detectors that can probe down to proton scales (<10-15 metres), suddenly we see that these powerful detectors could be affected by the quantum fluctuations of space-time itself. As the projection is of scales significantly larger than the encoded horizon, the projection would appear "blurry" according to Hogan.

### Is the Universe a Holographic Projection? - astroengine.com

Does projected quantum information become Spacetime objects with wave collapse? Think about quantum tunneling. A particle with mass is able to tunnel, but not when it is decohered. It became a spacetime object after the barrier. Are quantum fluctuations the entropy of our Holographic Principle?

### Does the holographic principle project holograms from ...

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 ...

### Publications | Hawaii Institute for Unified Physics

It is suggested that dark energy originates from the quantum fluctuations of spacetime limited by the event horizon of the universe. Several potential problems of the explanation are also discussed. The possible holographic origin of dark energy is investigated.

### Explaining Holographic Dark Energy - NASA/ADS

One recently discussed model for this kind of space-time fluctuations is the holographic principle which allows to deduce the structure of these fluctuations.

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

We find an exact quantized expression of the Schwarzschild solution to Einstein's field 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.

### Research Publications

Due to quantum fluctuations, spacetime is foamy on small scales. The degree of foaminess is found to be consistent with holography, a principle prefigured in the physics of black hole entropy. It has bearing on the ultimate accuracies of clocks and measurements and the physics of quantum computation.

### Entropy | Free Full-Text | Spacetime Foam: From Entropy ...

In its simplest essence, the solution comes from the quantum structure and multiply-connected geometry of spacetime, where discrete energetic fluctuations at the smallest scales curve spacetime to such a high degree that quantum gravity binds them together into tiny black holes - which are the elementary particles comprising matter.

### Spacetime geometry in quantum mechanics

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

suggested that the dark energy originates from the quantum fluctuations of spacetime limited by the event horizon of the universe. Several potential problems of the explanation are also discussed. Keywords: dark energy, holographic principle, holographic dark energy, UV/IR connection, bulk holography, spacetime foam, quantum fluctuations of ...

### Explaining holographic dark energy - CiteSeerX

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.

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