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The Quantum Vacuum: A Scientific and Philosophical Concept ...

A vacuum, classically understood, contains nothing. The quantum vacuum, on the other hand, is a seething cauldron of nothingness: particle pairs going in and out of existence continuously and rapidly while exerting influence over an enormous range of scales. Acclaimed mathematical physicist and natural philosopher Luciano Boi expounds the quantum vacuum, exploring the meaning of nothingness ...

The Quantum Vacuum: A Scientific and Philosophical Concept ...

In quantum field theory, the quantum vacuum state is the quantum state with the lowest possible energy.

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Generally, it contains no physical particles. Zero-point field is sometimes used as a synonym for the vacuum state of an individual quantized field. According to present-day understanding of what is called the vacuum state or the quantum vacuum, it is "by no means a simple empty space". According to quantum mechanics, the vacuum state is not truly empty but instead contains fleeting electromag

Quantum vacuum state - Wikipedia
In The Quantum Vacuum, Peter Milonni describes the concept of the vacuum in quantum physics with an emphasis on quantum electrodynamics. He elucidates in depth and detail the role of the vacuum electromagnetic field in spontaneous emission, the Lamb

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shift, van der Waals, and Casimir forces, and a variety of other phenomena, some of which are of technological as well as purely scientific importance.

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The Quantum Vacuum: An Introduction to Quantum ...

The quantum vacuum; a scientific and philosophical concept, from electrodynamics to string theory and the geometry of the microscopic world. Boi, Luciano. Johns Hopkins U. Press 2011 222 pages \$75.00 Hardcover QC174

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The Quantum Vacuum | ScienceDirect
In the 1980s he described the so-called Bunch-Davies vacuum - the quantum vacuum that existed just fractions of a second after the big bang - when particles were popping

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BBC Radio 4 - The Life Scientific, Paul Davies on the ...

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Vacuum - Wikipedia

Quantum theory, however, allows

negative energy." According to

quantum physics, it is possible to

borrow energy from a vacuum at a

certain location, like money from a

bank," says Daniel Grumiller....

Quantum vacuum: Less than zero energy: Is it possible to ...

Physics Today 72, 10, 74 (2019);

<https://doi.org/10.1063/PT.3.4327>.

One usually imagines a vacuum as empty space devoid of any matter.

That picture isn't quite accurate

when quantum mechanics is taken

into account. Emptiness turns out to

be an illusion: The real vacuum is full

of activity in the form of quantum

fluctuations—sometimes thought of

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as virtual particles that appear and disappear so quickly that they don't violate Heisenberg's uncertainty principle.

A new twist on the quantum vacuum:
Physics Today: Vol 72 ...

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Describing and understanding the quantum vacuum is always a challenge to all these theories, as is also the comprehension of the main manifestation available of the quantum vacuum at nanometric scales, namely the Casimir effect (e.g.,

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"In quantum-field theory, the vacuum state is defined to be the state having the least energy density. Something funny happens when we use a free-field theory to study an interacting-field theory:...

FOLLOW-UP: What is the 'zero-point energy' (or 'vacuum ...

The quantum vacuum is a complex entity, one essential to understanding some of the most intriguing issues in twentieth-century physics, including cosmic singularity, dark matter and energy, and the existence of the

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Higgs boson particle. Boi explains with simple clarity the relevant theories and fundamental concepts of the quantum vacuum.

Geometry Of The

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The quantum vacuum is a manifestation of the quantum fields that fill the universe. It is, counterintuitively, not exactly empty, either. Within it, short-lived excitations of the fields...

Did Galaxies Grow from Quantum Static? - Scientific American

Quantum mechanics can be used to describe spacetime as being non-empty at extremely small scales, fluctuating and generating particle pairs that appear and disappear incredibly quickly. It has been

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Philosophical Concept suggested by some such as Paul Dirac that this quantum vacuum may be the equivalent in modern physics of a particulate aether. However, Dirac's aether hypothesis was motivated by his dissatisfaction ...

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