conferenceseries.com

J Laser Opt Photonics 2017, 4:3(Suppl)
DOI: 10.4172/2469-410X-C1-015

2nd International Conference on

Quantum Physics and Quantum Technology

September 25-26, 2017 Berlin, Germany

Quantum States in de Sitter Space

Mohammad Vahid TAKOOK
Department of Physics, Razi University, Kermanshah, Iran
Department of Physics, Science and Research branch, Islamic Azad University, Tehran, Iran

We begin by noting that while in the classical mechanics viewpoint a physical system or a phenomenon consists of particles and fields, from the semi-classical point of view, the field is the fundamental object, and in quantum field theory the quantum state is the fundamental entity in the universe. The quantum state can be described by the Hilbert space of the physical system. Significantly, the Hilbert space is obtained from the operator algebra and/or symmetrical group of the physical system. Hilbert spaces of quantum field theory in de Sitter ambient space formalism are constructed on compact homogeneous spaces. This formalism permits us to solve many problems in theoretical physics. 1- By imposing certain physical conditions, the total number of quantum "one-particle" states becomes finite. Then the entropy of the quantum fields on de Sitter space may be calculated and it is found to be finite and invariant for all inertial observers on de Sitter hyperboloid. 2- The infrared divergence problems in the massless minimally coupled scalar field and the linear gravity disappear. 3- The unique Bunch-Davies vacuum states can then be used for constructing a quantum field theory (in de Sitter universe) such that the de Sitter invariance and analyticity are preserved. 4- The interaction Lagrangian between the scalar field and the spinor field can be constructed à la gauge theory method. Then one may naturally construct a unitary de Sitter super-gravity on Bunch-Davies vacuum state.

takook@razi.ac.ir