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Third quantization and quantum universes. (English) Zbl 1404.83152
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Summary: We study the third quantization of the Friedmann-Robertson-Walker cosmology with N -minimal massless fields. The third quantized Hamiltonian for the Wheeler-DeWitt equation in the minisuperspace consists of an infinite number of intrinsic time-dependent, decoupled oscillators. The Hamiltonian has a pair of invariant operators for each universe with conserved momenta of the fields that play a role of the annihilation and the creation operators and that construct various quantum states for the universe. The closed universe exhibits an interesting feature of transitions from stable states to tachyonic states depending on the conserved momenta of the fields. In the classical forbidden unstable regime, the quantum states have googolplex growing position and conjugate momentum dispersions, which defy any measurements of the position of the universe.

MSC:

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Keywords:

quantum cosmology; third quantization; open FRW universe; closed FRW universe; tachyon modes

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