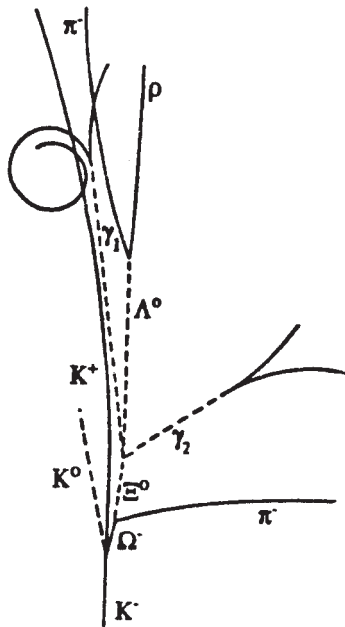


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CYCLE OF EVOLUTION WITH PHOTON REST ENERGY,
HUBBLE “CONSTANTS” AND TIME-DEPENDENT
COSMOLOGICAL “CONSTANT”, 363**

H. Strusny
Hohenschoenhauser Str. 1
10369 Berlin, Germany

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**UNIVERSE AND TIME-REVERSAL ANTI-UNIVERSE AS ETERNAL
CYCLE OF EVOLUTION WITH PHOTON REST ENERGY, HUBBLE
“CONSTANTS” AND TIME-DEPENDENT COSMOLOGICAL “CONSTANT”**

H. Strusny

Hohenschoenhauser Str. 1
10369 Berlin, Germany
p.ressel@freenet.de

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Abstract

In this work, we give a detailed review of the transition from the final state of the universe and the time-reversal anti-universe in the direction to the state of the big bang as a start of an eternal cyclic evolution, i.e. these two states are related to one another, so that we can estimate their parameters and the lifetime of the sterile neutrinos. The beginning of the universe and the anti-universe results from two equivalent energy uncertainties via one quantum fluctuation of the vacuum (origin), so that they expand in the opposite time directions. These Euclidian universes are based on the zero-point oscillations. The dark matter as well as the dark energy are described via the massive sterile breakup neutrinos as well as the massless sterile neutrino decay and breakup products, respectively. We estimate the rest energy of the photons, so that we can derive the quantum mechanical zero-point velocity. This rest energy of the photons, which must be identical with the rest energy of the gravitons, is confirmed by the intergalactic magnetic field. In the framework of the Λ CDM model, we derive various Hubble “constants” for the different epochs of evolution of the universes in excellent agreement with the most recent observations in 2019. Thus, in future, we observe a slow linear expansion of the universes instead of their accelerated expansion, i.e. their accelerated expansion is decelerated. Via a time-dependent cosmological “constant”, we solve generally the discrepancy between the vacuum energy of the Planck scale and the present dark energy as a continuous transition in accordance with the quantum field theory. The same solution is obtained from the big bang to the final state of the universe, using again the Planck scale.