

Creation and evolution of traversable wormhole in FLRW universe

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Abstract

Recently we found the exact solution of the cosmological model with the Morris-Thorne type wormhole [1]. In this talk we use the new solution to consider the issue of the traversable wormhole creation and evolution under the background of the Friedmann-Lemaître-Robertson-Walker cosmological model. The highly concentration of matters constructing wormhole is assumed here. For the case of the dust-filled universe, the wormhole and the apparent horizon could not be created when the Hubble parameter was too high just after the big bang. Later as the speed of the scale factor slows down, a wormhole and the apparent horizon are created and expanded along the scale factor. However, when the lambda term is added to the dust-filled universe, it is called the CDM model, and the expansion of the wormhole is interrupted due to a very high speed of the scale factor, and disappears with the apparent horizon together from the spacetime.

[1] Sung-Won Kim, Phys. Lett. B **780** (2018) 174.