New Bubbles in Cosmology

Bum-Hoon Lee[1*], Wonwoo Lee[2]

[1]Center for Quantum Spacetime and Department of Physics, Sogang University, Republic of Korea

[2]Center for Quantum Spacetime

***Email of Presenting Author: bhl@sogang.ac.kr**

We investigate the possible types of vacuum bubbles. First, we introduce the false vacuum bubbles with compact geometry and their possible cosmological implication. This type of bubble is possible only if gravity taken into account. The radius and the nucleation rate is evaluated with the thin wall approximation. We also present oscillating type of bubble solutions. Another new type of tunneling is the decay of cosmic strings that are trapped in the false vacuum in a theory of scalar electrodynamics. The core of the string contains magnetic flux in the true vacuum, while outside of the string is the false vacuum. The decay of this string by tunneling will lead to the bulge with the true vacuum region is enlarged. Finally, we introduce the various Funini instanton tunneling solutions.

References:

[1] B.-H. Lee, C.H. Lee, W. Lee, and C. Oh, arXiv:1311.4279

[2] B.-H. Lee, W. Lee, R. MacKenzie, M. Paranjape, U. Yajnik, D. Yeom, Phys. Rev. D88 105008 (2013)

[3] B.-H. Lee, W. Lee, C. Oh, D. Ro, D. Yeom, JHEP 1306 003 (2013)