Avoiding a multiversal apocalypse from Coleman-De-Luccia transitions

Thibaut Coudarchet*†[1], Ben Freivogel[2], Björn Hassfeld[3], and Arthur Hebecker[1]

[1]Heidelberg University – P.O. Box 105760, Grabengasse 1, Heidelberg, Baden-Württemberg, 69047, Germany

[2]Institute of Theoretical Physics (ITFA) – Instituut voor Theoretische Fysica Valckenierstraat, 65 1018 XE Amsterdam, Netherlands

[3]University of Wisconsin-Madison – 1150 University Avenue, Madison, Wisconsin 53706-1390, USA, United States

Abstract

In this talk I will explain difficulties invovled in interpreting the Lorentzian emergence of spacetimes from Coleman-De-Luccia (CDL) instantons. In particular, when these transitions are of Type B, a situation ubiquitous in the de Sitter string theory landscape, it seems difficult to relate the instanton geometry to a genuine late-time transition from a parametrically large parent space to a small new de Sitter. Even more concerning is the known instability of these domain walls in the stringy landscape, which, under a naive interpretation of the instanton, would lead to the destruction of the global multiverse. I will thus describe a different approach, focused on the nucleation of small bubbles at late-times in an Hamiltonian formalism. I will show how to compute decay rates in this approach, which surprisingly reproduce the CDL results despite relying on a very different derivation and interpretation of how the new spacetime emerges.

*Speaker

†Corresponding author: thibaut.coudarchet@hotmail.fr