General Relativity and Quantum Cosmology

New instabilities of de Sitter spacetimes

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We construct an instanton describing the pair production of non-Kaluza Klein bubbles of nothing in higher odd dimensional de Sitter spaces. In addition to showing that higher dimensional de Sitter spaces have a nonzero probability to become topologically nontrivial, this process provides direct evidence for the association of entropy with cosmological horizons and that non-Kaluza Klein bubbles of nothing are a necessary ingredient in string theory or any other consistent quantum theory of gravity in higher dimensions.

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