

Emergent Universe in the Braneworld Scenario

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Abstract

According to Padmanabhan's proposal, the difference between the surface degrees of freedom and the bulk degrees of freedom in a region of space may result in the accelerating expansion of the Universe through the relation $dV/dt = N_{\text{sur}} - N_{\text{bulk}}$ where V , N_{bulk} and N_{sur} are the Hubble volume, the degrees of freedom related to the energy inside the bulk and the surface area, respectively. In this talk, we introduce a generalization of Padmanabhan's proposal in the context of braneworld models. Considering the modification of Friedmann equations arising from a general braneworld scenario, we obtain a correction term in Padmanabhan's relation, denoting the number of degrees of freedom related to the extrinsic curvature of the four-dimensional brane. Then, we show that the first and second laws of thermodynamics are valid for this general braneworld scenario in the state of thermal equilibrium, and in the presence of confined matter fields to the brane with the induced geometric fluid.