

Radion stabilization in higher curvature warped spacetime

Soumitra Sengupta

School of Physical Sciences,

Indian Association for the Cultivation of Science,

2A & 2B Raja S.C. Mullick Road,

Kolkata - 700 032, India.

We consider a five dimensional AdS spacetime in presence of higher curvature term like $F(R) = R + \alpha R^2$ in the bulk. In this model, we consider the dual scalar-tensor model and examine the possibility of modulus stabilization from the scalar degrees of freedom of higher curvature gravity free of ghosts. Our result reveals that the model stabilizes itself and the mechanism of modulus stabilization can be argued from a geometric point of view. We determine the region of the parametric space for which the modulus (or radion) can to be stabilized. We also show how the mass and coupling parameters of radion field are modified due to higher curvature term leading to modifications of its phenomenological implications on the visible 3-brane. We examine our result in the context of the parameters of the original $F(R)$ model by mapping the scalar-tensor theory back to the $F(R)$ model.