Contribution ID: 46

Type: not specified

Dilaton gravity at the brane with general matter-dilaton coupling

In the ongoing search for a unified description of gravity and the gauge interactions of the Standard Model, string theories are usually regarded as the most promising proposal. At the leading order the low-energy effective action in string theories, restricted to gravity and the dilaton, yields precisely the standard Einstein gravity coupled to the dilaton field. Regarding that the very formulation of string theories requires additional spatial dimensions, I will address such dilaton gravity in a 5-dimensional brane scenario. I will derive in the covariant approach the effective Einstein-like brane equation for a general non-minimal coupling of the dilaton to the brane matter Lagrangian in the Einstein frame - thus accounting for the lack of a clear consensus as to which of the conformally-related frames is the natural physical frame. The bulk's influence on the brane gravity will be clearly identified. Subsequently, I will show that the inhomogeneities in the perfect fluid on the brane (describing the matter content of the universe) are highly constrained in this scenario for the common assumption of the anti de Sitter type bulk.

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