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On multidimensional gravity and the Casimir effect

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We study the properties of an effective potential for the scale factor of extra dimensions in a Kaluza-Klein-type model with a spherical extra factor space, including a function of the scalar curvature and other quadratic curvature invariants, taking into account the Casimir energy of massless scalar fields. We demonstrate the existence of a minimum of the potential, able to induce a physically reasonable value of the effective cosmological constant in our space-time. Under the adopted assumptions, it is shown that the huge Casimir energy density can be compensated by the fine-tuned contribution of the curvature-nonlinear terms in the original action.

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