

Abstract Submitted
for the APR05 Meeting of
The American Physical Society

An Alternative to Dark Energy: $\Lambda = 0$ Accelerating Cosmologies with Exchange between the Bulk and Brane GRANT MATHEWS, University of Notre Dame, KENICHI UMEZU, KIYOTOMO ICHIKI, TOSHITAKA KAJINO, NAOJ and University of Tokyo, MASANOBU YAHIRO, Kyushu University — We study the cosmological brane world scenario in which the bulk dimension is not *empty*. Rather, exchange of mass-energy between the bulk and the brane is allowed. The evolution of matter fields to an observer on the brane is then modified by new terms in the energy momentum tensor describing this exchange. In this paper we specifically investigate the constraints from various cosmological observations on the flow of matter from the bulk to the brane. Interestingly, we show that it is possible to have a $\Lambda = 0$ cosmology in the brane which satisfies all presently available cosmological constraints. At the same time this model also accounts for the suppression of the CMB power spectrum at low multipoles. In this cosmology, the observed cosmic acceleration is attributable to the so-called "dark radiation" associated with the projection of the flow of matter from the bulk to the brane. A peculiar aspect of this cosmology is that the universal dark matter content may be significantly larger than that of a standard Λ CDM cosmology. Its influence, however, is offset by the dark-radiation term. Possible other observational tests of this new cosmological paradigm are suggested.

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Date submitted: 14 Jan 2005

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