

General Relativity and Quantum Cosmology

Constraints on Shift-Symmetric Scalar-Tensor Theories with a Vainshtein Mechanism from Bounds on the Time Variation of G

Eugeny Babichev, Cedric Deffayet, Gilles Esposito-Farese

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We show that the current bounds on the time variation of the Newton constant G can put severe constraints on many interesting scalar-tensor theories which possess a shift symmetry and a nonminimal matter-scalar coupling. This includes, in particular, Galileon-like models with a Vainshtein screening mechanism. We underline that this mechanism, if efficient to hide the effects of the scalar field at short distance and in the static approximation, can in general not alter the cosmological time evolution of the scalar field. This results in a locally measured time variation of G which is too large when the matter-scalar coupling is of order one.

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