

Cosmological Aspects of a Unified Dark Energy and Dust Dark Matter Model Dual to Quadratic Purely Kinetic K-Essence

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Abstract. Recently, a model of modified gravity plus single-scalar-field model was proposed by Guendelman et al., in which the scalar Lagrangian couples symmetrically both to the standard Riemannian volume-form given by the square-root of the determinant of the Riemannian metric, as well as to another non-Riemannian volume-form given in terms of an auxiliary maximal-rank antisymmetric tensor gauge field. This model provides an exact unified description of both dark energy and dark matter, because on the one hand, it dynamically generates a cosmological constant, and on the other – it features a “dust” fluid with geodesic flow as a result of a hidden Noether symmetry, which can be interpreted as a dark matter candidate. Here we apply this $f(R)$ theory with two measures to cosmology and we report our first results.