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E I N L A D U N G

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zum Vortrag

von

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„From the Weyl-Schrödinger connection to the accelerating Universe - extending Einstein's gravity via a length preserving nonmetricit“

Abstract:

One of the important extensions of Riemann geometry is Weyl geometry, which is essentially based on the ideas of conformal invariance and nonmetricity. A similar non-Riemannian geometry was proposed by Erwin Schrödinger in the late 1940s, in a geometry which is simpler, and (probably) more elegant than the Weyl geometry. Even it contains nonmetricity, the Schrödinger connection preserves the length of vectors under parallel transport, and thus seems to be more physical than the Weyl connection. Interestingly enough, Schrödinger's approach did not attract much interest in the field of gravitational physics. It is the goal of the present talk to reconsider the Schrödinger geometry as a potential candidate for a gravitational theory extending standard general relativity.

We consider a gravitational action constructed from a length preserving non-metricity, in the absence of torsion, and investigate its variation in both Palatini and metric formalisms. While the Palatini variation leads to standard general relativity, the metric version of the theory adds some non-metricity dependent extra terms in the gravitational Einstein equations, which can be interpreted as representing a geometric type dark energy. After obtaining the generalized Friedmann equations, we analyze in detail the cosmological implications of the theory, by considering two distinct models, corresponding to a dark energy satisfying a linear equation of state, and to conserved matter energy, respectively.

We compare the predictions of the Weyl-Schrödinger cosmology with a set of observational data for the Hubble function, and with the results of the λ standard paradigm.

The Weyl-Schrödinger cosmological models give a good description of the observational data, and, for certain values of the model parameters, they can reproduce almost exactly the predictions of the λ model.

Hence, the Weyl-Schrödinger theory represents a simple, and viable alternative to standard general relativity, in which dark energy is of purely geometric origin.

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