



Contribution ID: 268

Type: **Talk in the parallel session**

Alternatives to Lambda: Torsion, Generalized Couplings, and Scale Invariance

Wednesday, 7 July 2021 11:00 (20 minutes)

We present a comparative analysis of current observational constraints on three recently discussed alternative models for explaining the low-redshift acceleration of the universe: the generalized coupling model by Feng and Carloni, the scale invariant model by Maeder (an example of a broader class first proposed by Canuto et al., which we also study), and the so-called steady-state torsion model of Kranas et al. These are compared to the traditional parametrization of Chevallier, Polarski and Linder. Each of the candidate models is studied under two different assumptions: as genuine alternatives to LambdaCDM (where a new degree of freedom would be expected to explain the recent acceleration of the universe without any cosmological constant) and as parametric extensions of LambdaCDM (where both a cosmological constant and the new mechanism can coexist, and the relative contributions of both are determined by the data). Our comparative analysis suggests that, from a phenomenological point of view, all such models neatly divide into two classes, with different observational consequences.

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Session Classification: Theories of Gravity: Alternatives to the Cosmological and Particle Standard Models

Track Classification: Alternative Theories: Theories of gravity: alternatives to the cosmological and particle standard models