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Constraining the Teleparallel Universe

The latest DESI results, suggesting a dynamical dark energy equation of state, have reinvigorated interest in modified teleparallel theories, such as $f(T)$ gravity, as viable alternatives to the standard cosmological model. In this talk, I present a systematic investigation of several popular and novel $f(T)$ models, examining their viability in light of current observational data. By applying recent cosmological datasets, including Type Ia Supernovae, Plank 2018, BAO, and Hubble parameter measurements, we derive constraints on key model parameters and explore the sensitivity of each model to different datasets using Monte-Carlo-Markov-Chains. The analysis not only highlights which forms of $f(T)$ are most favored by data but also identifies unique signatures that could distinguish torsion-based gravity from curvature-based frameworks. This work contributes toward the broader goal of building a consistent, observationally viable theory of gravity beyond the standard paradigm.

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