

# Cosmologies with Gravitational Anomalies and Axions: modified profiles of Gravitational Waves and warm dark matter properties

*Monday, 11 July 2022 15:45 (45 minutes)*

I discuss a string inspired model of cosmology, characterised by gravitational anomalies and torsion, in the early stages, which may provide a geometric origin of the entire dark sector of the Universe, from a running-vacuum-model inflation to axionic dark matter, the axion degrees of freedom being associated with torsion. During inflation, the model may, under some circumstances, lead to enhanced gravitational-wave perturbations and produced densities of primordial black holes. At post inflationary (radiation) eras, in models with massive right-handed neutrinos, one may have CPT Violating Leptogenesis, as a result of Lorentz-Violating backgrounds of the torsion-related axion fields, generated during inflation from condensates of primordial gravitational waves that induce, in turn, gravitational-anomaly condensates.

In the current era, such a model may contribute to observable in principle deviations from Lambda-CDM, and alleviation of the observed tensions in the cosmological data, provided, of course, the latter are not due to astrophysical/statistical uncertainties. Non-perturbative effects in such models (e.g. string instantons) may also generate non-derivative couplings between axions and right-handed neutrinos, which in turn may affect properties of warm dark matter in galactic structure.

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