

JOINT TUFTS/MIT COSMOLOGY SEMINAR

A varying Newton constant and the Hubble tension

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We investigate whether the tension on the measurements of the Hubble parameter between the most recent SN and Planck 2018 data can be alleviated by a variation of Newton's constant between the early and the late Universe. This changes the expansion rate before recombination, similarly to the addition of extra relativistic degrees of freedom. A simple setup to implement a varying Newton's constant is that of a scalar-tensor theory of gravity, with a scalar field coupled to the Ricci scalar. If the scalar field starts in the radiation era at values slightly below M and with non-minimal coupling close to one, a dynamical transition occurs naturally around the epoch of matter-radiation equality and the field evolves towards zero at late times. As a consequence the Hubble tension decreases while still evading current solar system and BBN constraints on deviations from GR. The agreement of this setup with cosmological data is compared to updated results on the scenario with dark radiation.

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