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On how BAO shape the late-time solutions to the H_0 tension, and the w XCDM

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In this talk I will first review the late-time phenomenology required to solve the Hubble tension, making special emphasis on the pivotal role played by the data on baryon acoustic oscillations (BAO) in the building of the inverse distance ladder. I will show, in particular, how the angular (2D) and anisotropic (3D) BAO data, despite being obtained from the same parent catalogues of tracers, lead to completely different solutions. While 3D BAO calls for a phantom-like transition in the effective dark energy (DE) density at $z < 0.15$, accompanied by a growth of the absolute magnitude of supernovae in the same redshift range, 2D BAO requires negative values of the effective DE density at $z > 1.5-2$. This is a clear manifestation of the existing tension between the 2D and 3D BAO data sets, which could be hinting at the presence of unaccounted for systematic or underestimated uncertainties in one or both data sets. I will quantify this tension employing a model-independent method. Finally, I will discuss a model called w XCDM with a transition from a phantom matter phase to quintessence at $z \sim 1.5$ that allows to solve the H_0 and growth tensions very efficiently when angular BAO is used in the analysis. In Bayesian terms, this model is strongly preferred over its competitors and might also explain the existence of unexpectedly massive galaxies at $z = 5 - 10$, as unveiled by the James Webb Space Telescope.

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