



Contribution ID: 492

Type: **Invited talk in a parallel session**

Ruling Out New Physics at Low Redshift as a solution to the H_0 Tension

Thursday, 11 July 2024 15:00 (25 minutes)

What has everyone so excited about the H_0 tension is the potential for discovering new physics, such as the physics of dark energy. In particular, the question of new physics explanations for this tension are often divided into whether the new physics plays a role at high redshift or low redshift. In this talk, I will make the case that there can be no low-redshift solution to the H_0 tension. To robustly answer this question, I used a very flexible parametrization for the dark energy equation of state, $w(z)$, such that every cosmological distance still allowed by the data exists within this prior volume. To then answer whether there exists a satisfactory solution to the H_0 tension within this comprehensive parameterization, I constrained the model using different partitions of the Planck, eBOSS/SDSS DR16 BAO, Pantheon SN and SH0ES H_0 datasets. When constrained by just the CMB+ H_0 datasets, there exists a set of $w(z)$ which yields high H_0 values, but these $w(z)$ functions are ruled out by the SN and BAO datasets. In other words, the constraint from CMB+SN+BAO datasets does not allow for high H_0 values and converges around $w(z)=-1$. I will also talk about how this story changes when replacing the eBOSS/SDSS BAO constraint with the DESI BAO constraint

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Session Classification: Dark energy and the accelerating universe

Track Classification: Dark Energy and Large Scale Structure (DE): Dark Energy and the accelerating universe