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The Hubble Constant in the Axi-Higgs Universe

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The Λ CDM model provides an excellent fit to the CMB data. However, a statistically significant tension emerges when its determination of the Hubble constant H_0 is compared to the local distance-redshift measurements. The axi-Higgs model, which couples ultralight axions to the Higgs field, offers a specific variation of the Λ CDM model. It relaxes the H_0 tension as well as explains the 7 Li puzzle in Big-Bang nucleosynthesis, the S_8 tension with the weak-lensing data, and the observed isotropic cosmic birefringence in CMB. In this letter, we demonstrate how the H_0 and S_8 tensions can be resolved simultaneously, by correlating the axion impacts on the early and late universe.

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