

How a local structure impacts our understanding on fundamental physics

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In current concordance cosmological model, Lambda-CDM model, we are facing serious cosmic tensions, such as Hubble tension, S_8 tension, dipole tension, etc. These problems challenge the basic assumption of cosmology, cosmological principle. In this talk, I will show how a local structure, a Gpc-scale void, impacts our understanding on Hubble tension, S_8 tension, and dipole tension, and a misinterpretation on cosmic tensions could mislead our understanding on fundamental physics. Meanwhile, if such a Gpc-scale void exists, the cosmological principle would be strongly broken. Then, we will combine recent DESI BAO result to reconstruct the density profile of this local structure to show its potential existence.

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