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Could the H0 Tension be Pointing Toward the Neutrino Mass Mechanism?

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Within the framework of ΛCDM, the local determination of the Hubble constant disagrees – at the 4.4 sigma level – with that inferred from the very accurate CMB observations by the Planck satellite. This clearly motivates the study of extensions of the standard cosmological model that could reduce such tension. Proposed extensions of ΛCDM that reduce this so-called Hubble tension require an additional component of the energy density in the Universe to contribute to radiation at a time close to recombination.

In this talk, I will show that pseudo-Goldstone bosons – associated with the spontaneous breaking of global lepton number – lead to a non-standard early Universe evolution that can help to reduce the Hubble tension. I will show that current CMB observations can constraint scalar-neutrino couplings as small as 10-13, which within the type-I seesaw mechanism correspond to scales of lepton number breaking as high as ˜ 1 TeV. Finally, I will argue that future CMB observations will test wide and relevant regions of parameter space of scenarios in which the spontaneous breaking of global lepton number is the mechanism behind the observed neutrino masses.

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