

Dark neutrino interactions make inflationary CMB B-modes blue and phase out Hubble tension

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New interactions of neutrinos with a subdominant component of dark matter can prevent them from free streaming. As a result, the inflationary gravitational waves escape the damping by neutrinos and, with respect to the standard Λ CDM cosmology, there is enhancement of primordial gravitational wave amplitude and CMB B-modes on small scales. The effect on the CMB scalar acoustic oscillations is the absence of neutrino induced phase shift that is present in the standard Λ CDM cosmology with free streaming neutrinos. The dark neutrino interaction therefore shifts the acoustic oscillation features in the CMB temperature and E-mode polarization power spectra thus pushing the CMB inferred value of the Hubble constant higher, alleviating the Hubble tension. The inflationary CMB B-modes, if measured precisely with future experiments, are therefore a potential probe of new interactions beyond the standard model and can test this solution to the Hubble tension.

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