DPF-PHENO 2024

Contribution ID: **424** Type: **not specified**

Cosmological implications of gauged $U(1)_{B-L}$ on $\Delta N_{\rm eff}$ in the CMB and BBN

Tuesday 14 May 2024 17:15 (15 minutes)

We calculate the effects of a light, very weakly-coupled boson X arising from a spontaneously broken $U(1)_{B-L}$ symmetry on $\Delta N_{\rm eff}$ as measured by the CMB and Y_p from BBN. Our focus is the mass range $1\ {\rm eV} \ lesssim m_X \ lesssim 100\ {\rm MeV}$. We find $U(1)_{B-L}$ is more strongly constrained by $\Delta N_{\rm eff}$ than previously considered. While some of the parameter space has complementary constraints from stellar cooling, supernova emission, and terrestrial experiments, we find future CMB observatories including Simons Observatory and CMB-S4 can access regions of mass and coupling space not probed by any other method.

Mini Symposia (Invited Talks Only)

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Session Classification: Cosmology & Dark Energy

Track Classification: Cosmology & Dark Energy