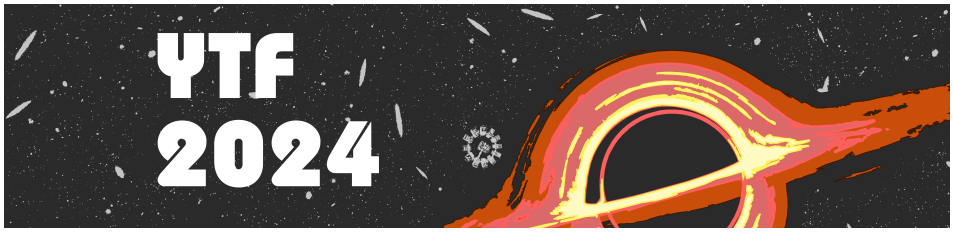

Contribution ID: **13** Type: **not specified**

Relaxing Limits from Big Bang Nucleosynthesis on Heavy Neutral Leptons with Axion-like Particles

Thursday 19 December 2024 11:30 (30 minutes)

Heavy neutral leptons (HNLs) are constrained by requirements of Big Bang Nu- cleosynthesis (BBN) as their decays significantly impact the formation of the primordial elements. We propose here a model where the primary decay channel for the HNLs is to an axion-like particle (ALP) and a neutrino. Consequently, HNLs can decay earlier and evade the BBN bound for lower masses, provided the ALPs themselves decay consider- ably later. Further cosmological and astrophysical constraints limit severely the range of validity of the ALP properties. We find that a new parameter region opens up for HNLs with masses be- tween 1 MeV and 1 GeV, and active-sterile neutrino mixing strengths between 10−9 and 10−6 that is consistent with constraints and can be probed in future searches. In such a scenario, current bounds as well as sensitivities of future direct HNL searches such as at NA62 and DUNE will be affected.

Primary author: ZHANG, Zhong (UCL)

Presenter: ZHANG, Zhong (UCL)

Session Classification: Axions and Astroparticle Phenomenology