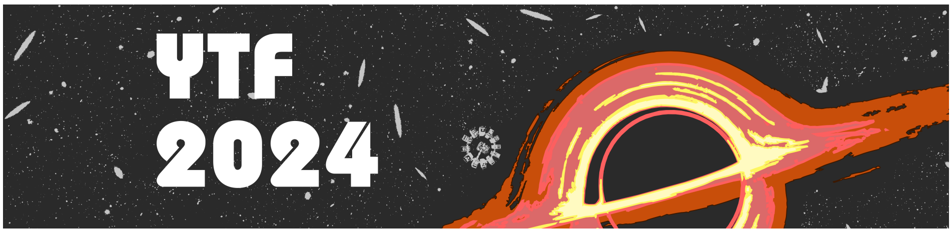

Contribution ID: **16** Type: **not specified**

A Natural Mechanism for Resonant Leptogenesis

Thursday, 19 December 2024 14:00 (30 minutes)

I will present a natural mechanism to achieve resonant leptogenesis through a novel approach involving thermal corrections to sterile neutrino masses. In standard leptogenesis, right-handed neutrinos are introduced as an extension to the Standard Model, generating a lepton asymmetry via CP-violating decays. This asymmetry is then converted into a baryon asymmetry through sphaleron processes. Resonant leptogenesis, where the masses of two sterile neutrinos are nearly degenerate, enhances CP violation but requires fine-tuning.

In this work, I propose a model of non-thermal leptogenesis gauged under $U(1)_{B-L}$ symmetry, where the near-degeneracy of sterile neutrino masses is dynamically achieved through thermal corrections at early times. I will show that the dominance of thermal masses over zero-temperature masses across a large parameter space naturally fulfils the degeneracy condition, enabling resonant leptogenesis without fine-tuning. Preliminary benchmark results indicate that this mechanism allows for significantly lighter sterile neutrino masses than standard non-thermal leptogenesis, expanding the parameter space for viable models.

I will conclude by discussing extensions to this framework, including the exciting prospect of testing our predictions through the detection of a gravitational wave background linked to the $U(1)_{B-L}$ symmetry breaking.

Primary authors: Mr SPALDING, Angus (University of Southampton); Prof. WHITE, Graham (University of Southampton); Dr GOSHAL, Anish (University of Warsaw)

Presenter: Mr SPALDING, Angus (University of Southampton)

Session Classification: Baryogenesis and Leptogenesis