Contribution ID: **143** Type: **Oral**

Bounds on Ultra Heavy HNLs

Wednesday 9 July 2025 15:00 (12 minutes)

Heavy Neutral Leptons (HNLs) are hypothetical particles that are able to explain neutrino oscillations. The presence of HNLs induces charged lepton flavor violating (cLFV) processes. Non-observations of these processes puts the strongest limits on parameters of HNL much heavier than the electroweak scale.
We demonstrate that for such HNLs, the branching ratio of cLFV processes is actually mass-dependent. Given this fact, we improve current bounds on HNL mass and mixing angle. Furthermore, we perform a perturbative unitarity analysis to identify the domain of validity of our results.

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Session Classification: Student Talks