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Flavor Covariant Formalism for Transport Phenomena

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Flavor effects play an important role in the time-evolution of particle number densities in a statistical ensemble with arbitrary flavor content. We present a fully flavor covariant formalism for transport phenomena, which captures consistently all flavor effects. As an application, we study flavor effects in a Minimal Resonant Leptogenesis scenario. In particular, we show that our flavor covariant formalism provides a unified description of three distinct physical phenomena, namely, resonant mixing and coherent oscillations between the heavy-neutrino flavors, and quantum decoherence in the charged-lepton sector. An interplay between these effects could enhance the final lepton asymmetry, thereby enhancing the testability of the leptogenesis mechanism in laboratory experiments.

Primary author: Dr DEV, Bhupal (University of Manchester)

Presenter: Dr DEV, Bhupal (University of Manchester)

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