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Testing leptogenesis models through the measurement of leptonic CP violation at the LHC

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Leptogenesis provides a compelling explanation of the baryon asymmetry of the Universe. It uses lepton-number-violating (LNV) decays of heavy right-handed neutrinos, which also generate neutrino masses. These neutrinos can, in fact, be light enough to be produced in low-energy processes. If their LNV decays can be observed, this would directly constrain the parameter space of leptogenesis models. We calculate the CP asymmetries and branching ratios for various LNV decays, identifying viable parameter regions where collider signals are compatible with constraints on leptogenesis models. Using analytical methods and MadGraph simulations, we find that lower neutrino masses are tightly constrained, while the 30–100 GeV range remains promising. To extend these tests, we are exploring higher-mass regimes through scattering processes, providing a quantitative framework to test leptogenesis models at colliders.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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