New Physics Directions in the LHC era and beyond



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Leptogenesis via Bubble Collisions

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We study a non-thermal realization of leptogenesis from the decays of sterile right-handed neutrinos (RHNs) produced via runaway bubble collisions at a generic first order phase transition. We explore the parameter space opened up by this new mechanism, which can accommodate RHN masses of several orders of magnitude heavier than the scale of the phase transition, while avoiding strong washout effects that conventional thermal leptogenesis would suffer from. Moreover, our framework can achieve the natural scale for neutrino mass generation with type-I seesaw (with $M_N \approx 10^{14}$ GeV). Preliminary studies seem to indicate that a promising correlation with high-frequency gravitational wave signals is possible.

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