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The quest for the origin of matter

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Observations strongly indicate that the baryonic matter in the observable universe is the remnant of a matter-antimatter asymmetry in the primordial plasma, which cannot be explained by the Standard Model of particle physics. If the new particles that are responsible for this asymmetry have masses below the TeV scale they may be discovered within the next decade. Using the example of low scale leptogenesis, we demonstrate that observables from different experiments can be combined to test the hypothesis that these particles are indeed the origin of matter. A key ingredient are state-of-the art simulations of processes in the early universe to make predictions for the properties of the new particles based on the requirement to explain the observed baryon-to-photon ratio.

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