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B+L violation at colliders and new physics

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Chiral electroweak anomalies predict baryon (B) and lepton (L) violating fermion interactions, which can be dressed with large numbers of Higgs and gauge bosons. The estimation of the total B + L-violating rate from an initial two-particle state —potentially observable at colliders —has been the subject of an intense discussion, mainly centered on the resummation of boson emission, which is believed to contribute to the cross-section with an exponential function of the energy, yet with an exponent (the "holy-grail"function) which is not fully known in the energy range of interest. We focus instead on the effect of electroweak fermions beyond the Standard-Model (e.g. in the MSSM) in the polynomial contributions to the rate. It is shown that B + L processes involving the new fermions have a polynomial contribution that can be several orders of magnitude greater than in the SM, for high centre-of-mass energies and light enough masses. We also present calculations that hint at a simple dependence of the holy grail function on the heavy fermion masses. Thus, if anomalous B + L violating interactions are ever detected at high-energy colliders, they could be associated with new physics.

Content of the contribution

Theory

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