

Lam-Tung relation breaking effects within the framework of SMEFT

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The breaking of the Lam-Tung relation in the Drell-Yan process at the LHC exhibits a long-standing tension with the Standard Model (SM) prediction at accuracy. This tension could be explained by weak dipole interactions of leptons and quarks, associated with the Z-boson within the framework of the Standard Model Effective Field Theory (SMEFT). Additionally, these weak dipole interactions could be cross-checked by measuring the violation effects of the Lam-Tung relation at future lepton colliders through similar processes. By considering different decay modes of the Z-boson, these channels exhibit distinct sensitivities to various dipole operators, providing a way to disentangle their individual effects, and the high flavor-tagging efficiencies at lepton colliders could provide strong constraints on the dipole interactions of heavy quarks.

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