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Probing the flavor of new physics in semileptonic transitions at high-pT

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High-p_T tail observables at the LHC offer a complementary probe to low-energy experiments for studying the flavor structure of the Standard Model and beyond. We discuss the high-p_T tails of neutral- and charged-current Drell-Yan processes to probe New Physics (NP) effects in semileptonic transitions. For this purpose, we describe the relevant cross-sections in terms of general form-factors, which are matched to the Standard Model Effective Field Theory (SMEFT), or to new resolved bosonic mediators arising in ultraviolet models. Using the latest run-2 datasets from LHC on the relevant mono-lepton and di-lepton production channels, we derive constraints on the SMEFT Wilson coefficients and the NP coupling constants. We also present the Mathematica package HighPT, which provides a simple way to compute the relevant high-p_T tail observables and to extract the complete LHC likelihood for Drell-Yan with general flavor structure. To illustrate the relevance of these results, we revisit the leptoquark explanations of the charged-current B-meson anomalies, by exploring the complementarity of our high-p_T constraints with the relevant low-energy observables.

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