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Rare b decays meet high-mass Drell-Yan

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Rare b hadron decays are considered excellent probes of new semileptonic four-fermion interactions of microscopic origin. However, the same interactions also correct the high-mass Drell-Yan tails. In this work, we revisit the first statement in the context
of this complementarity and chart the space of short-distance new physics that could show up in rare b decays. We analyze the latest b ⟶ ql+l− measurements, where q = d or s and l = e or μ, including the most recent LHCb RK(∗) update, together with the latest charged and neutral current high-mass Drell-Yan data, pp ⟶ lν and pp ⟶ l+l−. We implement a sophisticated interpretation pipeline within the flavio framework, allowing us to investigate the multidimensional SMEFT parameter space thoroughly and efficiently. To showcase the new functionalities of flavio, we construct several explicit models featuring either a Z′ or a leptoquark, which can explain the tension in b ⟶ sμ+μ− angular distributions and branching fractions while predicting lepton flavor universality (LFU) ratios to be SM-like, as indicated by the recent data. Those models are then confronted against the global likelihood, including the high-mass Drell-Yan, either finding tensions or compatibility.

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