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Highly suppressed (Rare) b-quark processes

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Highly suppressed (Rare) b-quark processes provide an excellent probe into heavy New Physics (NP) scenarios in conjunction with stringent tests of the Standard Model (SM). Rare decays of the form $b \to s\nu\bar{\nu}$ appear in the $\Lambda_b \to \Lambda\nu\bar{\nu}u$ channel, that has not yet been observed, but is a promising avenue of exploration at future e^+e^- colliders, given the current status of b-quark anomalies. We provide an analysis of such decays in the SMEFT framework, accounting for the missing energy final states. Experimental deviations from the SM predictions connote the possible footprints of heavy NP events or dark sector final states that masquerade as undetectable neutrinos. To further probe the chiral structures of BSM contributions, we calculate a decay rate for polarized initial states, forming predictions of spin-angular correlations.

Primary authors: GADAM, Aditya; ALTMANNSHOFER, Wolfgang (UC Santa Cruz)

Presenter: GADAM, Aditya

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