

Recent $B^+ \rightarrow K^+ \nu \bar{\nu}$ excess at Belle II, (dark) SMEFT, and flavour structure

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Recently, the Belle II collaboration announced the first measurement of $\mathcal{B}(B^+ \rightarrow K^+ \nu \bar{\nu})$, which is found to be about 2.7σ higher than the SM prediction. We decipher the data with two new physics scenarios: the underlying $b \rightarrow s \nu \bar{\nu}$ transition is, besides the SM contribution, further affected by heavy new mediators that are much heavier than the EW scale, or amended by an additional decay channel with undetected light final states like dark matter or axion-like particles. These two scenarios can be most conveniently analyzed in the SMEFT and the dark SMEFT (DSMEFT) framework, respectively. We consider the flavour structures of the resulting effective operators to be either generic or satisfy the minimal flavour violation (MFV) hypothesis, both for the quark and lepton sectors.

Paper info

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