

# A new potential $B$ -flavour anomaly in $B_{d,s} \rightarrow K^{*0} \bar{K}^{*0}$

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In the context of the recently measured non-leptonic decays  $B_d \rightarrow K^{*0} \bar{K}^{*0}$  and  $B_s \rightarrow K^{*0} \bar{K}^{*0}$  we analyse the anatomy of the  $L_{K^{*0} \bar{K}^{*0}}$  observable that compares the longitudinal components of both decays. This observable is cleaner than the longitudinal polarisation fraction as it is afflicted only at subleading order in a  $1/m_b$  expansion by the theoretical uncertainties arising in the transverse components entering the polarisation fraction.

We find for the SM prediction  $L_{K^{*0} \bar{K}^{*0}} = 19.5_{-6.8}^{+9.3}$ , which implies a  $2.6\sigma$  tension with respect to the most recent data, pointing to a deficit in the  $b \rightarrow s$  transition of the non-leptonic decay versus the corresponding  $b \rightarrow d$  transition. We discuss potential New Physics explanations for this deviation at the level of the Weak Effective Theory and we identify that the two Wilson coefficients  $calC_4$  and  $calC_{8g}$  can play a central role in explaining this possible anomaly.

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