

$B \rightarrow K^* \mu \mu$: Charming Penguins strike back again?

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We critically reassess the theoretical uncertainties in the Standard Model calculation of $B \rightarrow K^* \mu \mu$ observables, focusing on the low q^2 region. We point out that even optimized observables are affected by sizable uncertainties coming both from full form factors, when one considers the departure from the infinite mass limit, and from long distance effects. In particular, we stress that for the main one, the charm-loop contribution, power suppression is efficiently at work only for very low q^2 : consequently, the uncertainties are expected to increase close to the $c\bar{c}$ threshold. Taking these uncertainties into account, we perform a Bayesian analysis and present both predictions and fit results obtained using the state-of-the-art experimental information available at present for this decay from recent LHCb data. Eventually, our study aims to show that no clean evidence of New Physics is possible to claim in this channel within the current theoretical knowledge.

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