



## Addendum: Test of lepton universality in beauty-quark decays

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### LHCb collaboration\*

In a new analysis since the publication of the original article, the LHCb collaboration performs a simultaneous test of muon-electron universality using  $B^+ \rightarrow K^+ \ell^- \ell^+$  and  $B^0 \rightarrow K^{*0} \ell^- \ell^+$  ( $\ell = e, \mu$ ) decays with data collected between 2011 and 2018, corresponding to an integrated luminosity of  $9 \text{ fb}^{-1}$  (ref. 1). Further details are provided in ref. 2. The decay-rate ratios of muon to electron modes,  $R_K$  and  $R_{K^*}$ , are measured in two  $q^2$  regions,  $0.1 < q^2 < 1.1 \text{ GeV}^2/c^4$  (low- $q^2$ ) and  $1.1 < q^2 < 6.0 \text{ GeV}^2/c^4$  (central- $q^2$ ).

In ref. 1 the value of  $R_K$  in the central- $q^2$  range is measured with the same data sample as in the initial *Nature Physics* publication, but different selection requirements and analysis procedures are used. The value obtained in ref. 1,  $R_K(\text{central} - q^2) = 0.949^{+0.042}_{-0.041}(\text{stat})^{+0.022}_{-0.022}(\text{syst})$ , differs from the originally published result in *Nature Physics*. The new analysis finds that a component of the shift can be attributed to statistical effects (with a Gaussian distribution width of 0.033, as evaluated through pseudoexperiments). The main differences come from the reduction of misidentified hadronic backgrounds to the electron-decay mode due to a tighter electron particle identification working point (shift of 0.064) and the modelling of the remaining residual contribution (shift of 0.038). The new  $R_K$  central- $q^2$  value is compatible with the Standard Model prediction<sup>1</sup> and supersedes the result originally published. The numerical results initially presented in this paper should not be used as input for any meta analysis.

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### References

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2. Aaij, R. et al. (LHCb Collaboration). Measurement of lepton universality parameters in  $B^+ \rightarrow K^+ \ell^+ \ell^-$  and  $B^0 \rightarrow K^{*0} \ell^+ \ell^-$  decays. *Phys. Rev. D* **108**, 032002 (2023).

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