



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 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 prediction¹ 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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