Erratum to: Measurements of the S-wave fraction in B0 → K+π−μ+μ− decays and the B0 → K*(892)0μ+μ− differential branching fraction

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Erratum: Measurements of the S-wave fraction in $B^0 \to K^+\pi^-\mu^+\mu^-$ decays and the $B^0 \to K^*(892)^0\mu^+\mu^-$ differential branching fraction

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Two issues have been identified in the measurement of the differential branching fraction of $B^0 \to K^*(892)^0\mu^+\mu^-$ decays presented in ref. [1]. Both of these issues involve the calculation of the ratio of efficiencies between the decay $B^0 \to J/\psi\, K^*(892)^0$ (normalisation mode) and the decay $B^0 \to K^*(892)^0\mu^+\mu^-$ (signal mode), denoted as R_ϵ in eq. (7.1) of ref. [1]. What follows is a brief description of the nature of these problems, followed by the corrected results.

To save computing resources, simulated events are only propagated through the full simulation of the LHCb detector if all charged final state decay products of the B^0 meson are within the geometrical acceptance, defined to be $10 < \theta < 400\,\text{mrad}$ in the polar angle between the particle trajectory and the z-axis. Additional loose kinematic criteria are also applied to the B^0 meson and its decay products such that the B^0 meson has $p_{\text{T}} > 1.5\,\text{GeV}/c$, the muons have $p > 2\,\text{GeV}/c$ and the mesons $p > 0.8\,\text{GeV}/c$. The efficiency for these requirements is estimated from dedicated simulated samples with the requirements omitted, and which are not propagated through the detector simulation. The first mistake involved the calculation of the efficiency of these criteria which meant that the effect of the momentum cuts on the B^0 and final state products was only accounted for in the signal decay but not the normalisation decay. This has now been corrected, leading to a decrease of the differential branching fraction by a multiplicative factor of 0.97 in each q^2 bin.

The factor R_ϵ involves calculating the reconstruction and selection efficiencies of the signal and normalisation processes in two different regions of invariant masses of the $K^+\pi^-$ system ($m_{K\pi}$). These regions are $644 < m_{K\pi} < 1200\,\text{MeV}/c^2$ for the signal and

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$796 < m_{K\pi} < 996\,\mathrm{MeV}/c^2$ for the normalisation modes. The second error was to perform the calculation of the efficiency of the signal process in the region $796 < m_{K\pi} < 996\,\mathrm{MeV}/c^2$ instead of $644 < m_{K\pi} < 1200\,\mathrm{MeV}/c^2$. This has now been corrected, resulting in a correction factor with a weak q^2 dependence. This correction factor varies between 0.89 in the lowest q^2 bin, rising to 0.95 in the highest q^2 bin due to the reduced available phasespace.

Having resolved both issues, the corrected results for the differential branching fraction in the q^2 region $1.1 < q^2 < 6.0\,\mathrm{GeV}^2/c^4$ is

$$\mathrm{d}\mathcal{B}/\mathrm{d}q^2 = \left(0.342\,^{+0.017}_{-0.017}(\mathrm{stat}) \pm 0.009(\mathrm{syst}) \pm 0.023(\mathrm{norm})\right) \times 10^{-7} c^4/\mathrm{GeV}^2.$$

This number should replace the differential branching fraction appearing in the abstract of ref. [1].

The integrated branching fraction of $B^0 \to K^*(892)^0\mu^+\mu^-$ decay is

$$\mathcal{B}\left(B^0 \to K^*(892)^0\mu^+\mu^-\right) = \left(0.904\,^{+0.016}_{-0.015} \pm 0.010 \pm 0.006 \pm 0.061\right) \times 10^{-6},$$

where the uncertainties, from left to right, are statistical, systematic, from the extrapolation to the full q^2 region and due to the uncertainty of the branching fraction of the normalisation mode. This number should replace the integrated differential branching fraction appearing at the bottom of section 7 of the original paper.

All other text remains unchanged. All tables and figures in which the measurements are affected are given below, with the numbering and captions being identical to those in the original paper.

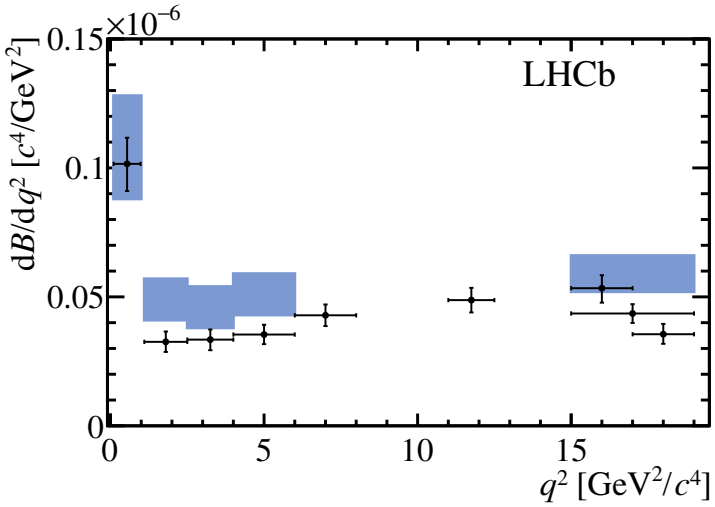

Figure 5. Differential branching fraction of $B^0 \to K^*(892)^0\mu^+\mu^-$ decays as a function of q^2. The data are overlaid with the SM prediction from refs. [47,48]. No SM prediction is included in the region close to the narrow $c\bar{c}$ resonances. The result in the wider q^2 bin $15.0 < q^2 < 19.0\,\mathrm{GeV}^2/c^4$ is also presented. The uncertainties shown are the quadratic sum of the statistical and systematic uncertainties, and include the uncertainty on the $B^0 \to J/\psi K^{*0}$ and $J/\psi \to \mu^+\mu^-$ branching fractions.

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q^2 bin (GeV^2/c^4)	$\mathrm{d}\mathcal{B}/\mathrm{d}q^2 \times 10^{-7}$ (c^4/GeV^2)
$0.10 < q^2 < 0.98$	$1.016\,^{+0.067}_{-0.073} \pm 0.029 \pm 0.069$
$1.1 < q^2 < 2.5$	$0.326\,^{+0.032}_{-0.031} \pm 0.010 \pm 0.022$
$2.5 < q^2 < 4.0$	$0.334\,^{+0.031}_{-0.033} \pm 0.009 \pm 0.023$
$4.0 < q^2 < 6.0$	$0.354\,^{+0.027}_{-0.026} \pm 0.009 \pm 0.024$
$6.0 < q^2 < 8.0$	$0.429\,^{+0.028}_{-0.027} \pm 0.010 \pm 0.029$
$11.0 < q^2 < 12.5$	$0.487\,^{+0.031}_{-0.032} \pm 0.012 \pm 0.033$
$15.0 < q^2 < 17.0$	$0.534\,^{+0.027}_{-0.037} \pm 0.020 \pm 0.036$
$17.0 < q^2 < 19.0$	$0.355\,^{+0.027}_{-0.022} \pm 0.017 \pm 0.024$
$1.1 < q^2 < 6.0$	$0.342\,^{+0.017}_{-0.017} \pm 0.009 \pm 0.023$
$15.0 < q^2 < 19.0$	$0.436\,^{+0.018}_{-0.019} \pm 0.007 \pm 0.030$

Table 2. Differential branching fraction of $B^0 \to K^*(892)^0\mu^+\mu^-$ decays in bins of q^2. The first uncertainty is statistical, the second systematic and the third due to the uncertainty on the $B^0 \to J/\psi\, K^{*0}$ and $J/\psi \to \mu^+\mu^-$ branching fractions.

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[1] LHCb collaboration, *Measurements of the S-wave fraction in $B^0 \to K^+\pi^-\mu^+\mu^-$ decays and the $B^0 \to K^*(892)^0\mu^+\mu^-$ differential branching fraction*, *JHEP* **11** (2016) 047 [arXiv:1606.04731] [INSPIRE].

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