

1 **Supplementary material for LHCb-PAPER-2015-060**
 2 **Ratios of branching fractions of b hadron decays to $\psi(2S)$ and J/ψ**

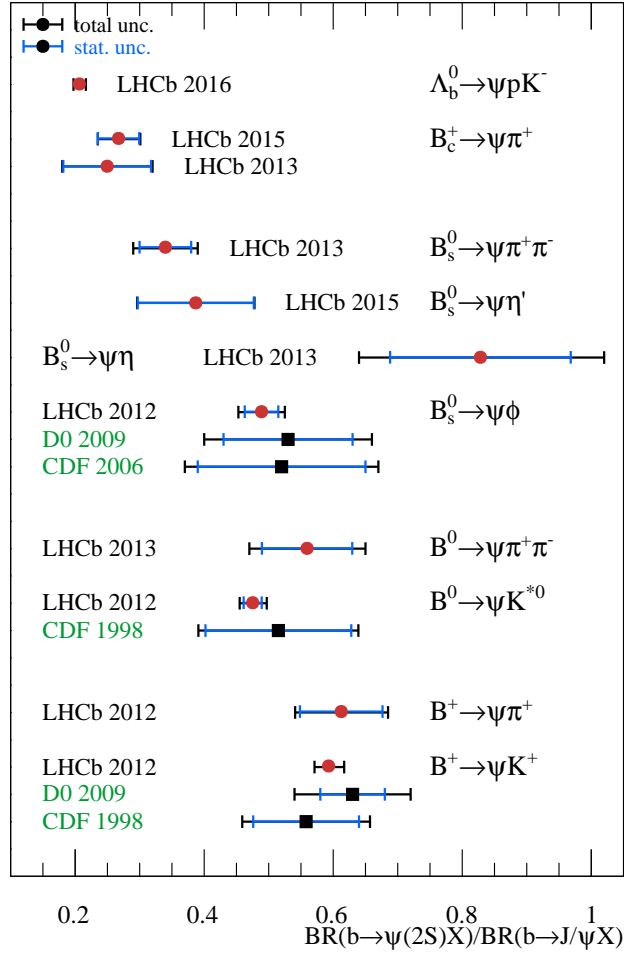


Figure 1: Ratios of branching fractions of b hadron decays to final states containing $\psi(2S)$ and J/ψ . Red circles correspond to measurements performed by LHCb collaboration [1–7] while black squares represent measurements of the other experiments [8–10]. Black outer error bars represent the total uncertainties of the measurements, while the blue inner error bars represent statistical uncertainties only.

3 $\psi(2S)$ branching fractions

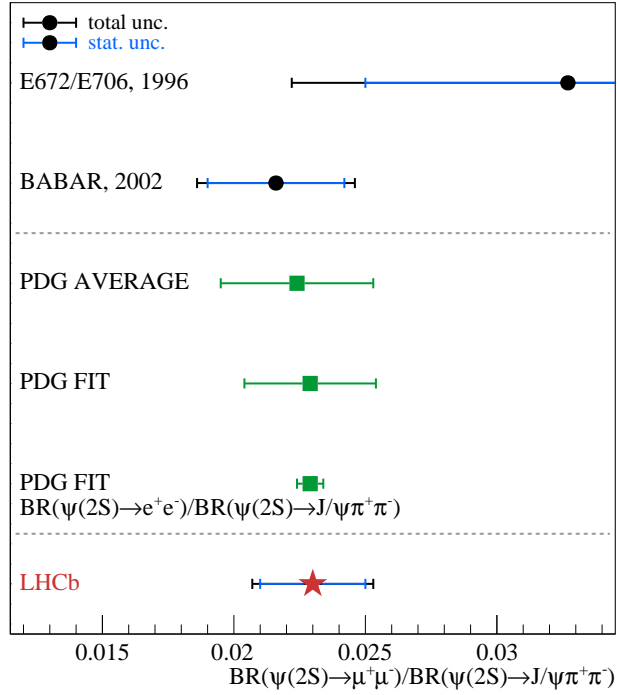


Figure 2: Comparison of a ratio of the $\psi(2S) \rightarrow \mu^+\mu^-$ and $\psi(2S) \rightarrow J/\psi \pi^+\pi^-$ branching fractions measured in this paper (red star) with previous results of E672/E706 [11] and BaBar [12] collaborations (black circles) and average and fit values derived by Particle Data Group [13] (green squares). The third green square represents the fit value of the Particle Data Group for the ratio of $\psi(2S) \rightarrow e^+e^-$ and $\psi(2S) \rightarrow J/\psi \pi^+\pi^-$ branching fractions. Black and green outer error bars represent the total uncertainties of the measurements, while the blue inner error bars represent statistical uncertainties only.

4 LHCb average of the Λ_b^0 mass

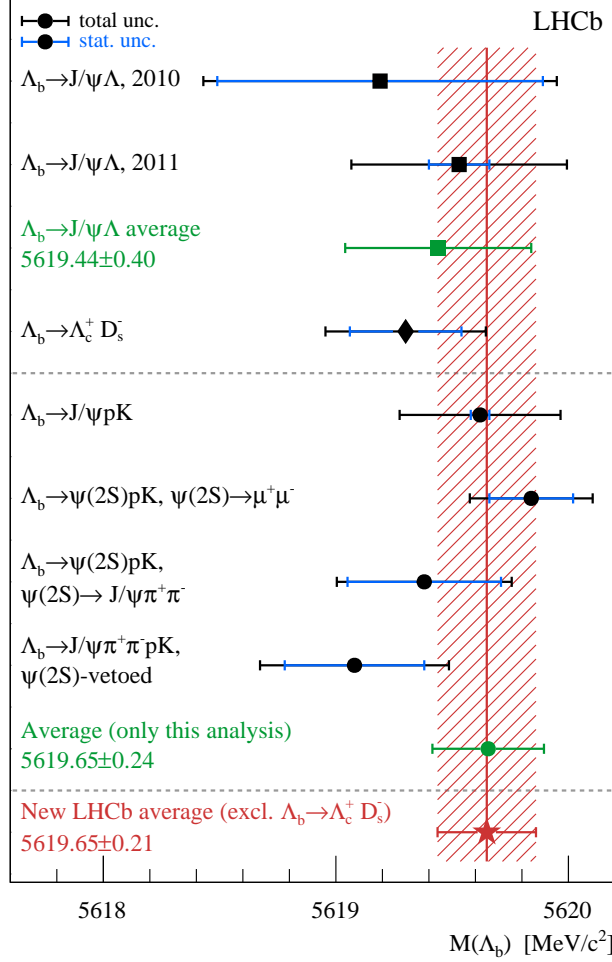


Figure 3: Comparison of the measurements of Λ_b^0 mass of this analysis (black circles) with the previous results using $\Lambda_b^0 \rightarrow J/\psi \Lambda$ decay in 2010 [14] and in 2011 [15] data (black squares) and Λ_b^0 mass derived from the known B^0 mass and the $\Lambda_b^0 - B^0$ mass difference measured with $\Lambda_b^0 \rightarrow \Lambda_c^+ D_s^-$ decay in 2011 data [16] (black diamond). Black outer error bars represent the total uncertainties of the measurements, while the blue inner error bars represent statistical uncertainties only. The green points represent the averages of previous LHCb measurements and measurements of this analysis, while the red point is the average of all the measurements excluding the one using the $\Lambda_b^0 \rightarrow \Lambda_c^+ D_s^-$ decay, which is in fact a measurement of $\Lambda_b^0 - B^0$ mass difference.

5 Measurements of the Λ_b^0 mass

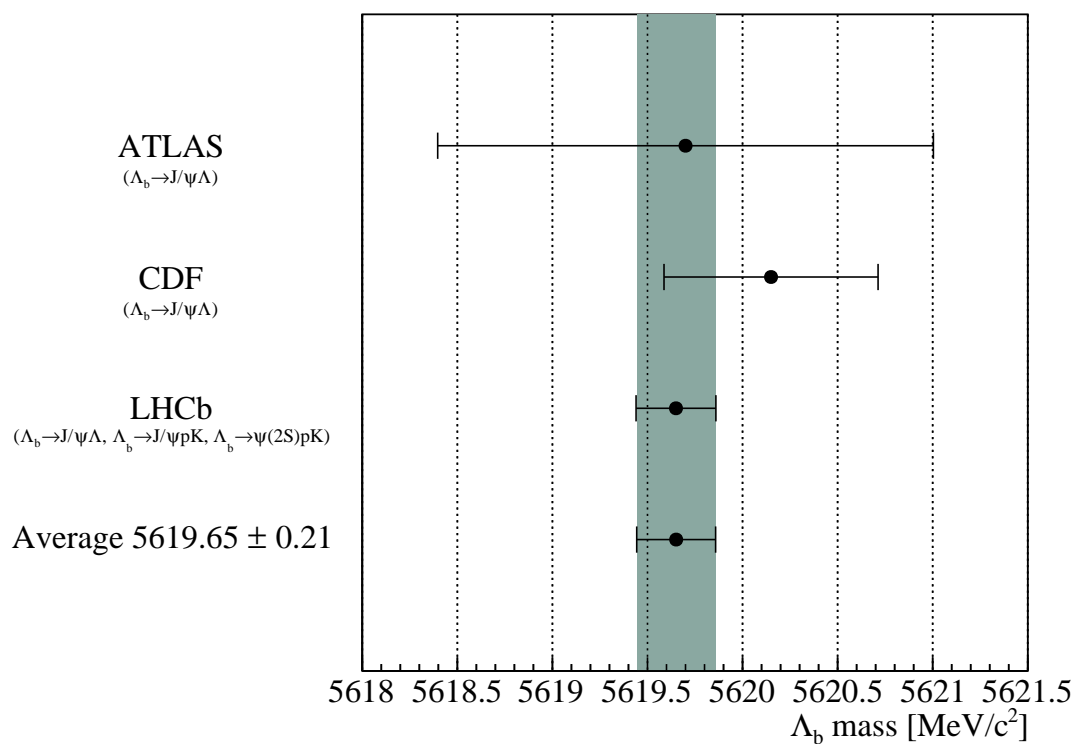


Figure 4: Comparison of the measurements of Λ_b^0 mass in the ATLAS [17], CDF [18] and LHCb experiments.

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