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Measurement of the forward-central bb^{-} production asymmetry

The conference note is available here (LHCb-CONF-2013-001) [↗](#)

More detailed information: ANA note 2013-007 [↗](#)

Abstract

A measurement of the forward-central bb^{-} production asymmetry is reported based on data collected by $\{\mbox{LHCb}\}$ in 2011 at $\sqrt{s}=7\text{TeV}$ corresponding to an integrated luminosity of 1.0~fb^{-1} . Events are selected that have two identified b jets, one of which is flavor tagged by the presence of a displaced muon with high momentum. The following results are obtained:

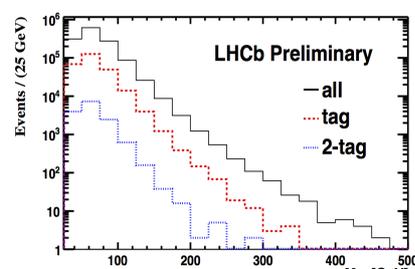
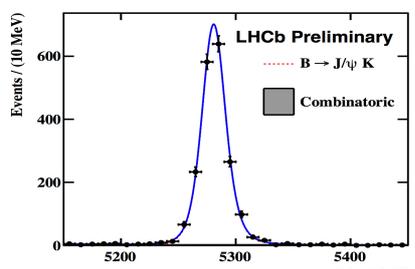
$$A_{bb^{-}\text{FC}}=(0.5\pm 0.5(\text{stat})\pm 0.5(\text{syst}))\%$$

$$A_{bb^{-}\text{FC}}(M_{bb^{-}}>100\text{ GeV})=(4.3\pm 1.7(\text{stat})\pm 2.4(\text{syst}))\%$$

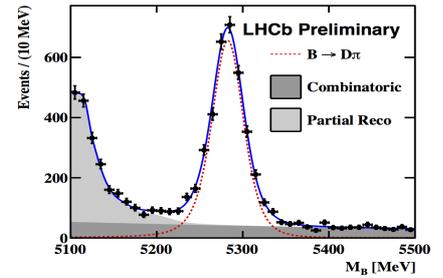
The asymmetry in the high-mass region is not corrected for the bb^{-} mass resolution. Studies of simulated data estimate the dilution due to the di-jet mass resolution to be a few percent.

Figures

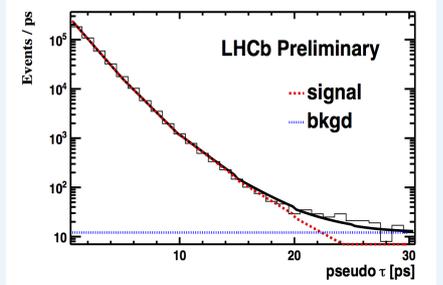
(Note, eps versions are available under attachments).

Caption	Figure
Di-jet $b\bar{b}$ mass distributions for (solid black) all events, (dashed red) flavor-tagged events and (dotted blue) doubly- flavor-tagged events.	
Distributed B candidate masses for $B\rightarrow J/\psi K^+$ decays used in the flavor-tagging study. Asymmetric Gaussian distributions are used for the signal PDFs; the combinatorial backgrounds are taken to be exponential	

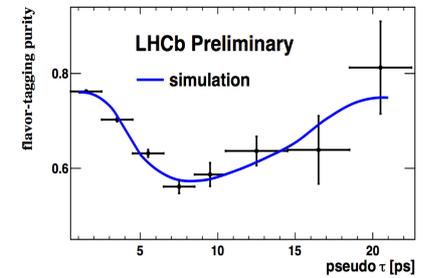
Distributed B candidate masses for $B^{+-} \rightarrow D^0 \pi^{\pm}$ decays used in the flavor-tagging study. Asymmetric Gaussian distributions are used for the signal PDFs; the combinatorial backgrounds are taken to be exponential, while the PDF of the partially-reconstructed background in $B^{+-} \rightarrow D^0 \pi^{\pm}$ is obtained from simulation



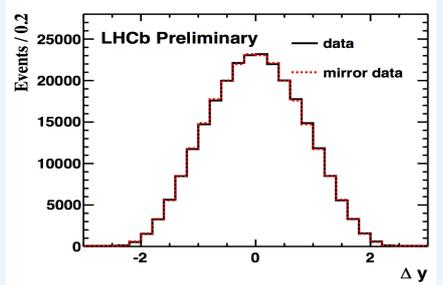
Observed (black solid) pseudo-lifetime distribution of flavor-tagged b jets. The signal shape (red dashed) is taken from simulation, while the background shape (blue dotted) is assumed to be uniform. The background is estimated to be $O(0.2\%)$



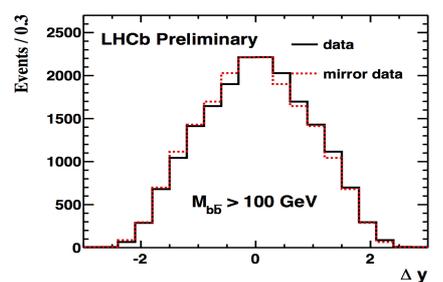
Observed time dependence of the tagging purity (black points). The (solid blue) curve is the predicted distribution obtained from simulation and has no free parameters



Observed Δy distributions for all events. The dashed distribution (mirror data) corresponds to $\Delta y \rightarrow -\Delta y$



Observed Δy distributions for events with measured $M_{bb} > 100$ GeV. The dashed distribution (mirror data) corresponds to $\Delta y \rightarrow -\Delta y$



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