Performance and study of B-meson spectra in pp and pPb collisions in CMS

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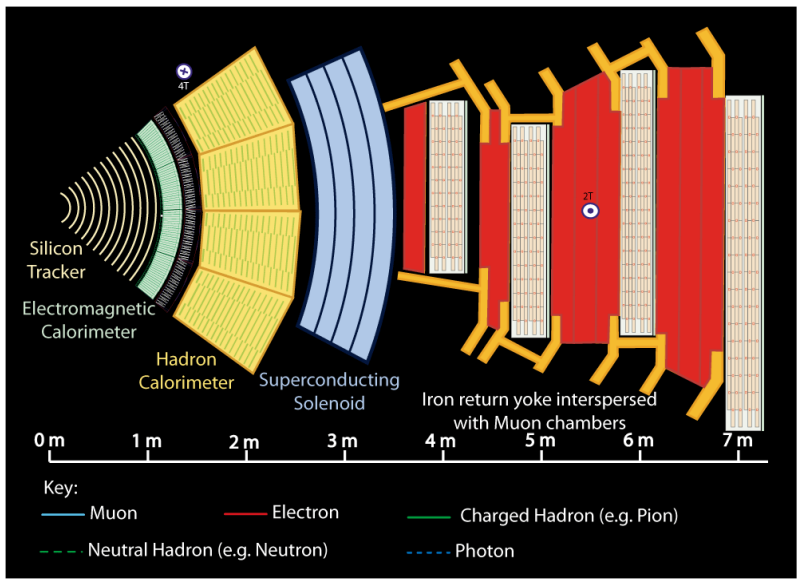
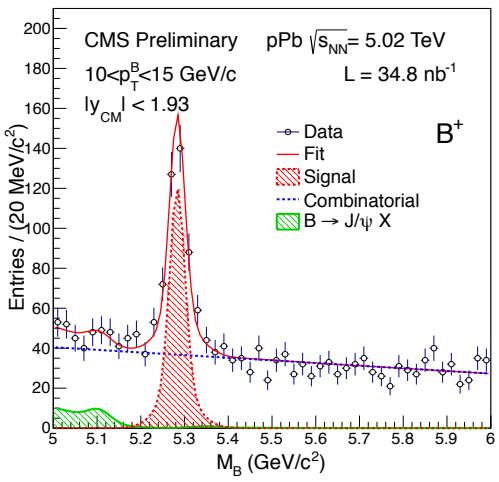
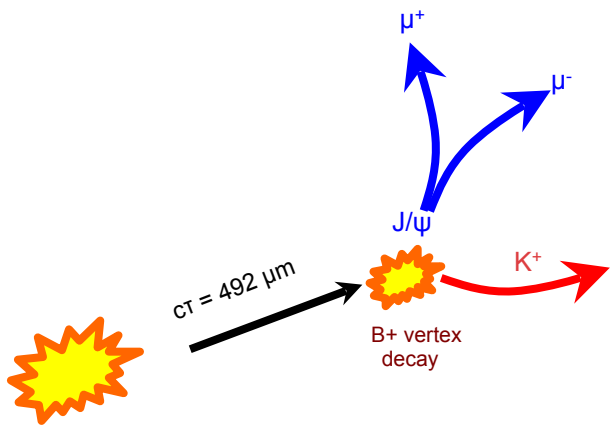
Why B-meson measurements?

- in pp collisions, they provide an important test for pQCD calculations at LHC energy regimes
- in nucleus-nucleus collisions, they are effective probes to study effects of in-medium b-quark energy loss
- proton-nucleus studies provide baseline for PbPb analyses and allow one to study cold nuclear matter effects (e.g. shadowing)
- **Channels under study:**
- $B^+ \rightarrow J/\psi\, K^+ \rightarrow \mu^+\mu^- K^+$, $B^0 \rightarrow J/\psi\, K^{0*} \rightarrow \mu^+\mu^- K^+\pi^-$, $B_s \rightarrow J/\psi\, \phi \rightarrow \mu^+\mu^- K^+K^-$





Invariant mass distribution of B^+candidates with $10<p_T<15$ GeV/c in pPb collisions at 5.02 TeV

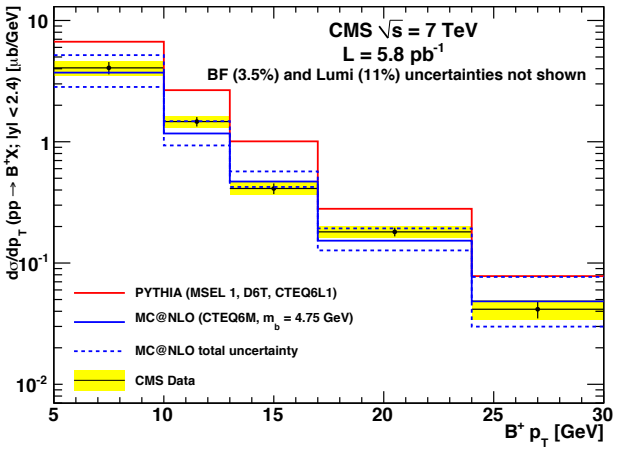


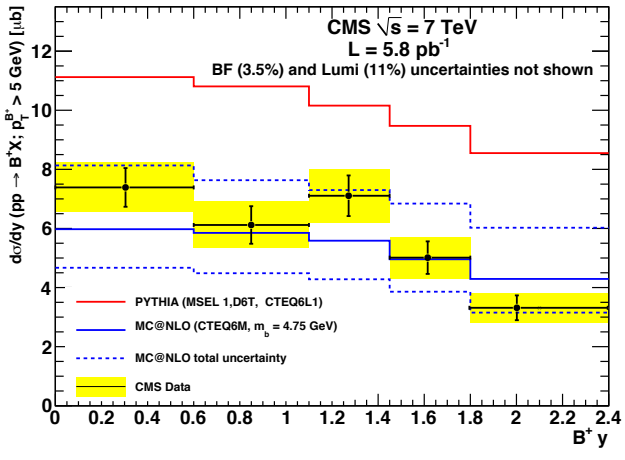
B-meson reconstruction in CMS

- J/ψ reconstruction by vertexing muon pairs with opposite charges using kinematic fits
- B-meson candidates built by associating tracks to the reconstructed J/ψ mesons
- Candidate selection based on multi-variate cut optimisation procedure

B-meson production cross sections in pp collisions:

- B^+, B^0, B_s p_T and y-differential cross sections measured in pp collisions at 7 TeV with integrated luminosity L=5.8 pb^{-1}
- CMS results well described by MC@NLO calculations and by PYTHIA





B-meson production cross section in pPb collisions:

- **First measurement of exclusive B-meson production at the LHC in heavy-ion collisions**
- p_T-differential cross section measurement of B^+, B^0, B_s and y-differential cross section of B^+ in pPb collisions at 5.02 TeV.
- Nuclear modification factors obtained using FONLL predictions to build the proton-proton reference at 5.02 TeV

→ R_{pA}^{FONLL} **consistent with unity within uncertainties**

→ **Results compatible with binary scaling hypothesis**