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## Performance study of the exclusively reconstructed $B^\pm$ meson in the $J/\psi$ decay channel with ALICE

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The  $B^\pm$  meson is produced more frequently than any other meson containing beauty quarks in pp collisions at the LHC. Measuring its production cross-section is important for two reasons. Firstly, it allows for testing perturbative quantum chromodynamics calculations. Secondly, it provides an essential reference for measurements of its nuclear modification factor ( $R_{AA}$ ) in heavy-ion collisions. The  $B^\pm$  meson  $R_{AA}$  measurement can provide new constraints on the partonic energy loss mechanism in the medium formed in heavy-ion collisions. Since the radiative energy loss depends heavily on the quark mass, the beauty quark, being the heaviest readily observable flavor, is a particularly valuable probe for investigating the mass dependence of the in-medium energy loss mechanisms. Due to its design, ALICE is unique in accessing beauty production in the low  $p_T$ -region at midrapidity ( $|y| < 0.9$ ).

This poster shows a performance study of the exclusive reconstruction of the  $B^\pm$  meson at midrapidity through the decay channel  $B^\pm \rightarrow J/\psi + K^\pm$ , with the  $J/\psi$  reconstructed in its dielectron decay channel. Exclusive reconstruction of beauty mesons will be done for the first time in ALICE during LHC Run 3. In previous LHC runs, inclusive beauty hadron measurements were carried out via non-prompt  $J/\psi$  using the displacement of the secondary vertices with respect to the primary vertex. This study, however, relies on full reconstruction of the  $B^\pm$  meson candidate, taking advantage of the improved vertex resolution provided by the upgraded Inner Tracking System of ALICE, fully operational during the LHC Run 3. The poster will show the status of the  $B^\pm$  meson reconstruction and expected performance in pp collisions at  $\sqrt{s_{NN}} = 13.6$  TeV at midrapidity.

### Category

Experiment

### Collaboration (if applicable)

ALICE

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