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## Studies of heavy quark dynamics using B mesons with the CMS experiment

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Heavy quarks are one of the most powerful probes to study the properties of quark-gluon plasma. We present new results on nuclear modification factors of  $B_s^0$  and  $B^+$  mesons, using proton-proton (pp) and lead-lead (PbPb) data recorded with the CMS detector in 2017 and 2018, respectively. The measured B meson nuclear modification factors over an extended transverse momentum range provide important information about the diffusion of beauty quarks and the flavor dependence of in-medium energy loss. In addition, understanding the hadronization mechanism is crucial for extracting the transport properties of the QGP. The  $B_s^0/B^+$  yield ratio in pp and PbPb can thus shed light on beauty hadronization mechanisms from small to large systems and on the relevance of parton recombination in the medium. We also report the first observation of the  $B_c^+$  meson in PbPb collisions. Given the low production cross-section in pp collisions, its production could be significantly enhanced by the recombination of beauty with charm quarks present in the hypothesized medium, providing additional insights into the recombination mechanism.

### Category

Experiment

### Collaboration (if applicable)

CMS

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