

## Simulating fix-target and heavy-ion collisions in LHCb

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The LHCb experiment is a fully instrumented forward spectrometer designed for precision studies in the flavour sector of the standard model with proton-proton collisions at the LHC. As part of its expanding physics programme, LHCb collected data also during the LHC proton-nucleus collisions in 2013 and 2016 and during nucleus-nucleus collisions in 2015. These datasets provide access to unique kinematic coverage due to the forward pseudo-rapidity of LHCb. Furthermore, in 2015 LHCb commissioned the internal gas target SMOG, becoming the only LHC experiment with a programme of fixed target physics. Any of these particular collision conditions required a different operational setup, as well as dedicated simulation production based on heavy-ion Monte-Carlo event generators and interface extensions of the standard LHCb simulation framework. In this talk, we present the work done to implement such a variety of simulation productions for heavy-ion collisions, and to validate the produced samples. The future perspectives of the heavy-ion collision simulations at LHCb will also be discussed.

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