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Gauss and Gaussino: the LHCb simulation software and its new experiment agnostic core framework.

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The LHCb experiment is resuming operation in Run3 after a major upgrade. New software exploiting modern technologies for all data processing and in the underlying LHCb core software framework is part of the upgrade. The LHCb simulation framework, Gauss, had to be adapted accordingly, with the additional constraint that it also relies on external simulation libraries. At the same time a decision was taken to consolidate the simulation software and extract all generic components into a new core experiment independent framework, called Gaussino. This new core simulation framework allows easier prototyping and testing of new technologies where only the core elements are affected. It relies on Gaudi for general functionalities and the Geant4 toolkit for particle transport, combining their specific multi-threaded approaches. A fast simulation interface to replace the Geant4 physics processes with a palette of fast simulation models for a given sub-detector is the most recent addition. Geometry layouts can be provided through DD4Hep or experiment specific software. A built-in mechanism to define simple volumes at configuration time and ease the development cycle is also available. A plug&play mechanism for modeling collisions and interfacing generators like Pythia and EvtGen is provided. We will describe the structure and functionality of Gaussino and how the new version of Gauss exploits the Gaussino infrastructure to provide what required for the simulation(s) of LHCb experiment.

In-person participation

Yes

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