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New Web Based Event Data and Geometry Visualization for LHCb

The LHCb detector is undergoing a comprehensive upgrade for data taking in the LHC's Run 3, which is scheduled to begin in 2022. The new Run 3 detector has a different, upgraded geometry and uses new tools for its description, namely DD4hep and ROOT. Besides, the visualization technologies have evolved quite a lot since Run 1, with the introduction of ubiquitous web based solutions or Augmented Reality (AR) for example. The LHCb collaboration has thus started the development of a new visualization solution, based on the Phoenix framework, developed jointly by several experiments in the context of the HEP Software Foundation (HSF). We present here the architecture and implementation of this new solution, as well as the different contributions made to the Phoenix ecosystem. In particular we discuss a generic tool for exporting ROOT geometries to the visualization application, which can be used to display in a browser either the whole detector or subparts of it. Extensions to the Phoenix visualization primitives regarding Calorimeters and performance improvements are also presented.

Significance

This paper details the work behind the new solution for visualizing (LHCb) geometry and event data. It builds on latest client side 3D technologies such as three.js, WebGL and Angular as well as Augmented Reality (AR) to provide a smoother and exciting user experience for Physics visualizations. It also demonstrates the integration of the (HSF) Phoenix Framework alongside an Experiment Software Stack and the standard High Energy Physics Frameworks like (ROOT). The tools developed have been kept generic and are thus reusable by other (HEP) experiments.

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Speaker time zone

Compatible with Europe

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