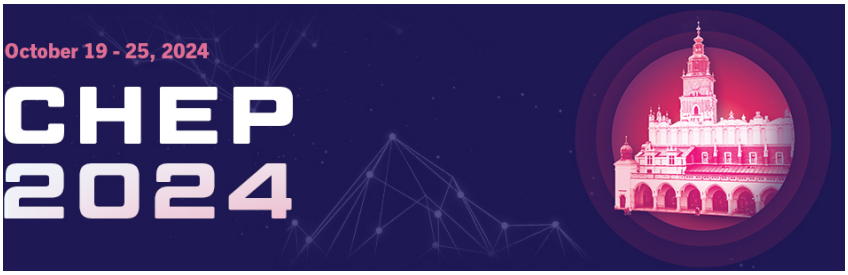

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Reconstruction Framework Advancements for Streaming Readout for the ePIC Experiment at the EIC

Monday 21 October 2024 15:00 (18 minutes)

The ePIC collaboration adopted the JANA2 framework to manage its reconstruction algorithms. This framework has since evolved substantially in response to ePIC's needs. There have been three main design drivers: integrating cleanly with the PODIO-based data models and other layers of the key4hep stack, enabling external configuration of existing components, and supporting timeframe splitting for streaming readout. The result is a unified component model featuring a new declarative interface for specifying inputs, outputs, parameters, services, and resources. This interface enables the user to instantiate, configure, and wire components via an external file. One critical new addition to the component model is a hierarchical decomposition of data boundaries into levels such as Run, Timeframe, PhysicsEvent, and Subevent. Two new component abstractions, Folder and Unfolder, are introduced in order to traverse this hierarchy, e.g. by splitting or merging. The pre-existing components can now operate at different event levels, and JANA2 will automatically construct the corresponding parallel processing topology. This means that a user may write an algorithm once, and configure it at runtime to operate on timeframes or on physics events. Overall, these changes mean that the user requires less knowledge about the framework internals, obtains greater flexibility with configuration, and gains the ability to reuse the existing abstractions in new streaming contexts.

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