

PODIO - Applying plain-old-data for defining physics data models

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PODIO is a C++ library that supports the automatic creation and efficient handling of HEP event data, developed as a new EDM toolkit for future particle physics experiments in the context of the AIDA2020 EU programme. Event

data models (EDMs) are at the core of every HEP experiment's software framework, essential for providing a communication channel between different algorithms in the data processing chain as well as for efficient I/O. Experience from LHC and the Linear collider community shows that existing solutions partly suffer from overly complex data models with deep object-hierarchies or unfavourable I/O performance. The PODIO project was created in order to address these problems. PODIO is based on the idea of employing plain-old-data (POD) data structures wherever possible, while avoiding deep object-hierarchies and virtual inheritance. At the same time it provides the necessary high-level interface towards the developer physicist, such as the support for inter-object relations, and automatic memory-management, as well as a ROOT-assisted Python interface. To simplify the creation of efficient data models, PODIO employs code generation from a simple yams-based markup language. In addition, it was developed with concurrency in mind in order to support the usage of modern CPU features, for example giving basic support for vectorisation techniques. This contribution presents the PODIO design, first experience in the context of the Future Circular Collider (FCC) and Liner Collider (LC) software projects, as well as performance figures when using ROOT as storage backend.

Primary Keyword (Mandatory)

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Tertiary Keyword (Optional)

Secondary Keyword (Optional)

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