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A flexible and modular data format ROOT-based implementation for HEP

A flexible and modular data format implementation for HEP applications is presented.

Designed to face HEP data issues, the implementation is based on the CERN ROOT toolkit.

The design is aimed to create a data format as much as possible modular and easily upgradable and extendable. Event informations are split into different files, that may contain different parts of the event (i.e. different sub-detectors) or different levels of abstraction (i.e. from raw information to high level quantities), in a fully transparent way for the final user.

Fully exploiting the ROOT "Friend" concept and the C++ inheritance, it has been possible to achieve the desired modularity and flexibility: the possibility to upgrade and extend without a full reprocessing, but also the simplicity of a standard ROOT-ple functionality (i.e. `TTree::Draw()`).

The file splitting in self-consistent TFile friends allows also a much more efficient distribution and upgrade of the data to the regional centers of a typical HEP experiment. It also gives the possibility to download and process only a small section of the event information, for example for subdetector studies or specific analyses, even on the user laptop.

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