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Detector-independent vertex reconstruction toolkit (VERTIGO)

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A proposal is made for the design and implementation of a detector-independent vertex reconstruction toolkit and interface to generic objects (VERTIGO). The first stage aims at re-using existing state-of-the-art algorithms for geometric vertex finding and fitting by both linear (Kalman filter) and robust estimation methods. Prototype candidates for the latter are a wide range of adaptive filter algorithms being developed for LHC/CMS, as well as proven ones (like ZVTOP of SLC/SLD). In a second stage, also kinematic constraints will be included for the benefit of complex multi-vertex topologies.

The design is based on modern object-oriented techniques. A core (RAVE) is surrounded by a shell of abstract interfaces (using adaptors for access from/to the particular environment) and a set of analysis and debugging tools. The implementation follows an open source approach and is easily adaptable to future standards.

Work has started with the development of a specialized visualisation tool, following the model-view-controller (MVC) paradigm; it is based on COIN3D and may also include interactivity by PYTHON scripting. A persistency storage solution, intended to provide a general data structure, was originally based on top of ROOT and is currently being extended for AIDA and XML compliance; interfaces to existing or future event reconstruction packages are easily implementable. Flexible linking to a math library is an important requirement; at present we use CLHEP, which could be replaced by a generic product.

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