



Contribution ID: 133

Type: Poster (Session A)

## **RAVE - an Open, Extensible, Detector-Independent Toolkit for Reconstruction of Interaction Vertices**

A toolkit is presented that takes a set of reconstructed particle tracks as its input and produces reconstructed interaction vertices as its output. It deals both with finding (pattern recognition) and with fitting (statistical estimation) of the interaction vertices. Its main design goals are ease of use, high integratability in existing software projects, extensibility, and generality. To this end the API is defined in an as simple as possible way. The various algorithms, and optionally, their parameter settings, are referenced by a simple string. This guarantees that the user code decouples completely from the toolkit internals. Also, maintaining backwards compatibility should become a trivial task. The Rave Toolkit is complemented by a simple standalone framework, called "Vertigo". Implementation, verification, and performance analysis of reconstruction algorithms should thus be possible in a very fast and straightforward manner. Rave has its roots in the CMS vertex reconstruction community. The current algorithmic parts of the toolkit are source code compatible with the original CMS software, but contributions from "outside" are highly welcome. The toolkit is written in C++, but interfaces for other languages (Java, Python) have been implemented via "SWIG". Applications outside the high energy physics community (e.g. in astrophysics, or nuclear physics) are highly desirable. An online demonstration of the toolkit with 3d graphics based on coin3d can be arranged. Thanks to the CMS Track and Vertex Reconstruction group, whose code is reused heavily in this project.

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