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Fireworks: A Physics Event Display for CMS

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Event displays in HEP are used for many different purposes, e.g. algorithm debugging, commissioning, geometry checking and physics studies. The physics studies case is unique since few user are likely to become experts on the event display, the breadth of information all such users will want to see is quite large although any one user may only want a small subset of information and the best way to display physics information sometimes requires a stylized rather than 3D accurate representation. Fireworks is a CMS event display which is specialized for the physics studies case. Fireworks provides an easy to use interface which allows a physicist to concentrate only on the data to which they are interested. Data is presented via graphical and textual views. Cross view data interpretation is easy since the same object is shown using the same color in all views and if the object is selected it is highlighted in all views. Objects which have been selected can be further studied by displaying a detailed view of just that object. Physicists can select which events (e.g. require a high energy muon), what data (e.g. which track list) and which items in a collection (e.g. only high-pt tracks) to show. Once the physicist has configured Fireworks to their liking they can save the configuration. Fireworks is built using the Eve subsystem of the CERN ROOT project and CMS's FWLite project. The FWLite project was part of CMS's new Event Data Model and recent code redesign which separates data classes into libraries separate from algorithms producing the data and uses ROOT directly for C++ object storage thereby allowing the data classes to be used directly in ROOT. The Fireworks project released its first Linux and mac version this summer and has received much positive feedback.

Primary author: Dr JONES, Christopher (CORNELL UNIVERSITY)

Presenter: Dr JONES, Christopher (CORNELL UNIVERSITY)

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