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The Geant4 physics validation repository

We describe the Geant4 physics validation repository and the technology used to implement it. The Geant4 collaboration regularly performs validation and regression tests where results obtained with a new Geant4 version are compared to data obtained by various HEP experiments or the results of previous releases. As the number of regularly performed validation tests increases and the collection of results grows, storing them and making them available to the collaborators and users community becomes a challenge. We decided to organize the materials in one central repository and to make this data easily available via a web application.

The Physics Validation Repository consists of three components:

The first component is a PostgreSQL relational database that stores both simulated and experimental data in form of images with meta data or raw data points. The meta data describes the test and lists the references from where the experimental data for comparison was obtained from, as well as other parameters that describe the test

(e.g. beam particle, target material, etc.). The second component is a Java API which is based on the data access object (DAO) design pattern and provides an abstract interface to the database. Finally a web application based on Java Platform, Enterprise Edition (Java EE) is deployed on a GlassFish Application server. The web application

allows to interactively select and overlay compatible data, e.g. to compare the results of different releases, different physics models or target materials in one plot.

The web application also provides security and authentication to grant access to groups of functions and data that are internal to the Geant4 collaboration, e.g. viewing results from development releases, upload of new tests

and/or modification of selected tests.

We use the PrimeFaces JSF (Java Server Faces) Framework to create interactive, modern looking web interfaces and

the jfreechart java library or the Highcharts JavaScript library for plotting.

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