

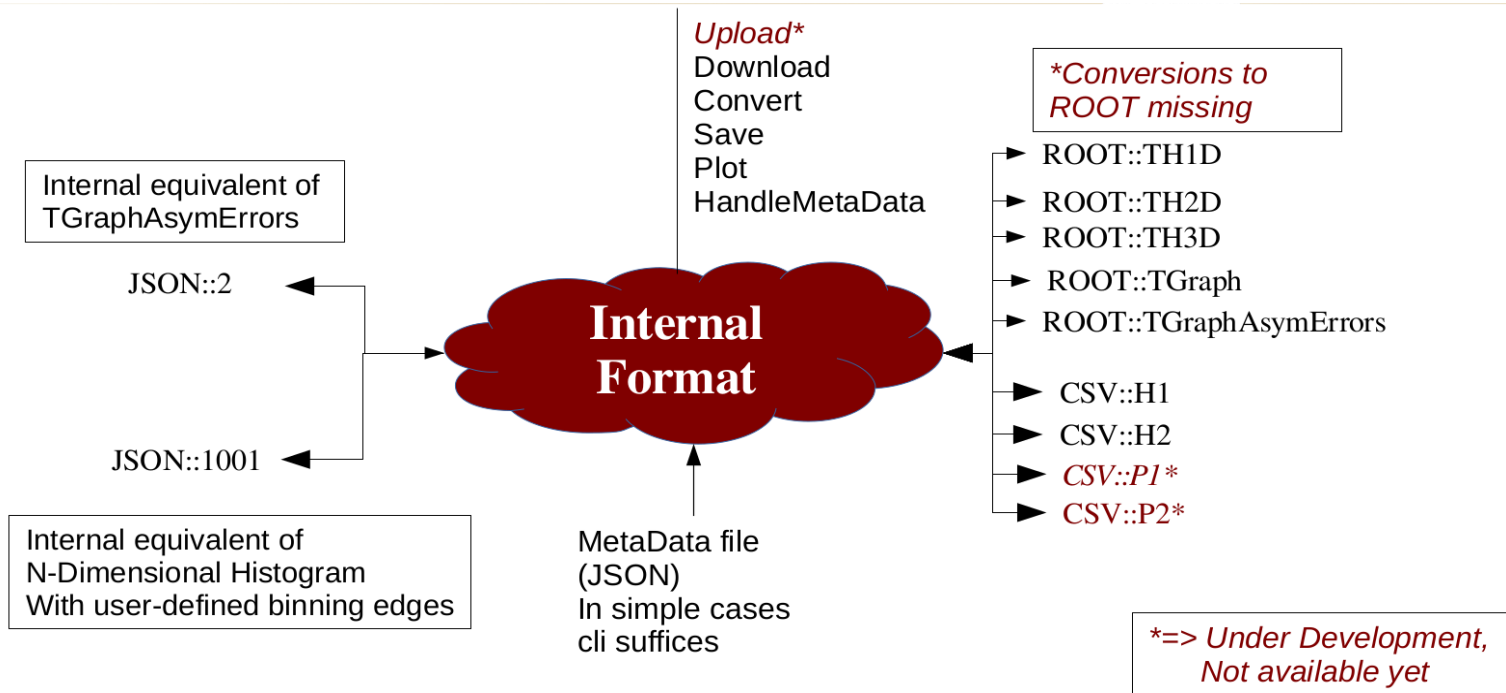
Report on parallel session 5A, a.k.a. the DoSSiER session: *Database of Scientific Simulation and Experimental Results*

09:00	Status of DoSSiER	<i>WENZEL, Hans</i>	
	<i>Aula Magna, Ferrara</i>		09:00 - 09:20
	Status of python uploader	<i>DOTTI, Andrea et al.</i>	
	<i>Aula Magna, Ferrara</i>		09:20 - 09:30
10:00	Status of C++ interface	<i>KONSTANTINOV, Dmitry</i>	
	<i>Aula Magna, Ferrara</i>		09:30 - 09:40
	Demo: from running a test to displaying the results	<i>WENZEL, Hans et al.</i>	
	<i>Aula Magna, Ferrara</i>		09:40 - 10:10
	Status of Node.js-based Dossier server	<i>IFRIM, Ioana et al.</i>	



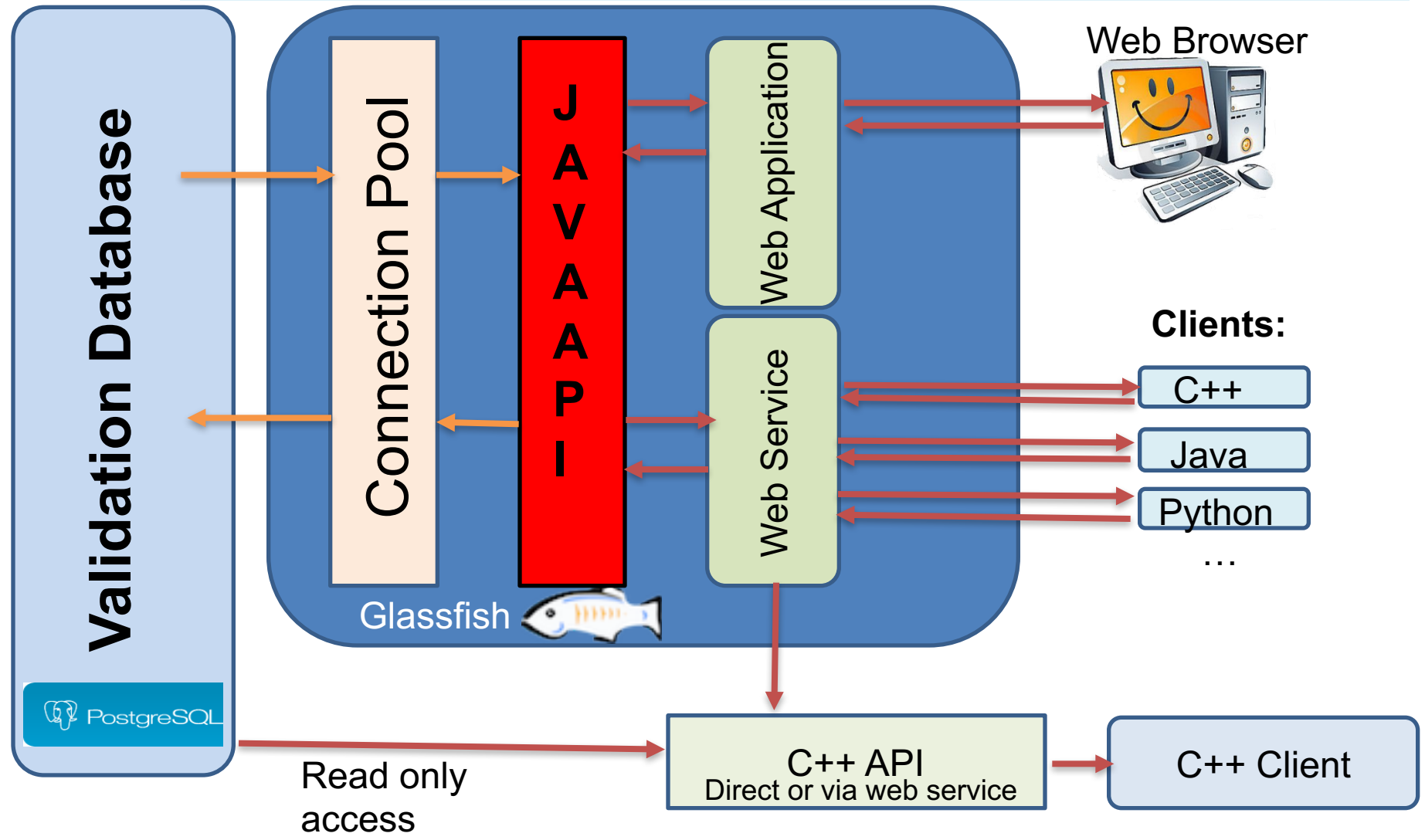
Python program

- to read and convert histograms from/to different formats: ROOT, ASCII (CSV), JSON
- Download from and upload to DoSSiER
- Inspect and interact with histograms (*matplotlib*)
- CLI (script integration) or API (integration in python programs) are available



+ Demo: From Analysis output to Display making use of his tool and the uploader

JavaEE based design





Database of Scientific Simulation and Experimental Results



Left

- Main
 - Exp. data browser
 - Exp. data table browser
 - DisplayTest
 - Display Statistics
- Dictionaries/Lookup
 - Access
 - Beams
 - Datatypes
 - Materials
 - Mcdetails
 - Mctools
 - Observables
 - Particles
 - Reactions
 - References
 - Working Groups

Introduction

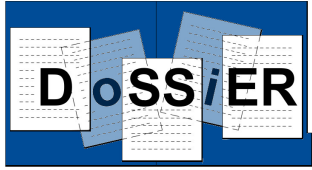
Collaborations providing Monte Carlo generators or simulation programs regularly perform validation and regression tests where results obtained with a new software version are compared to data obtained by various experiments (physics validation) or the results of previous releases (regression testing). We have organized the materials in one central repository and make this data available via this web application. It 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.

			
Experiment	Geant4	GeantV	GENIE



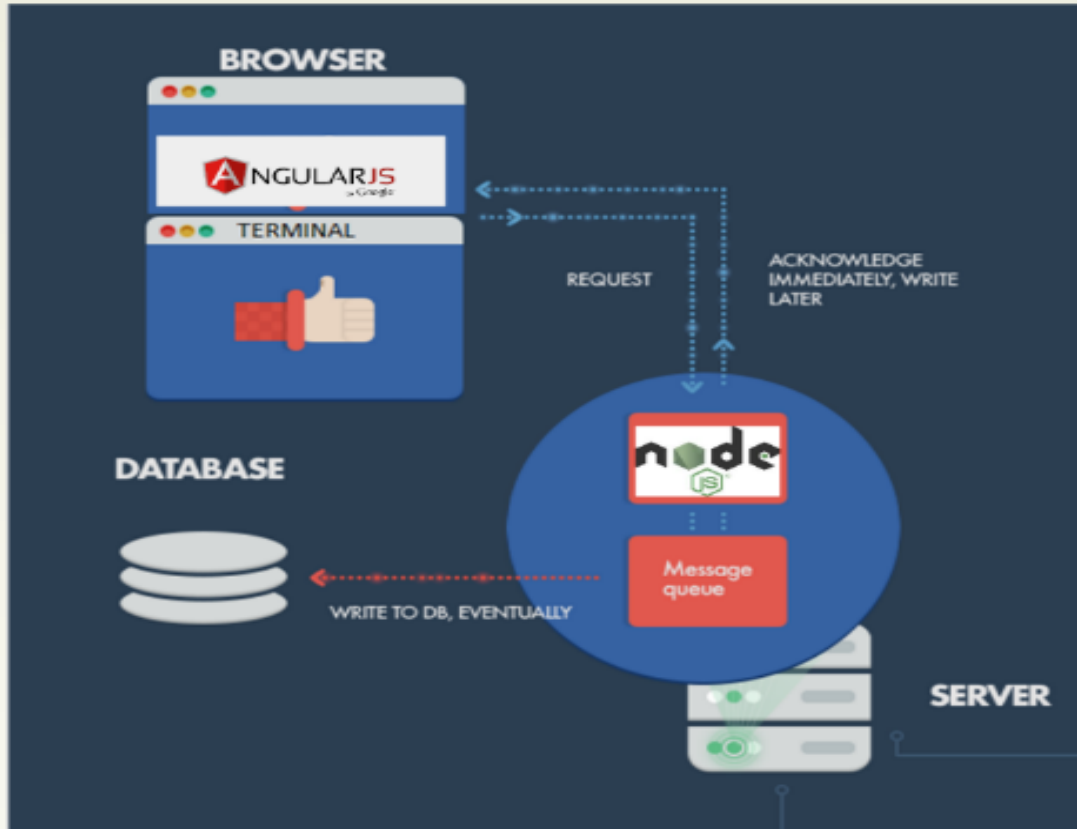
NATIONAL ACCELERATOR LABORATORY

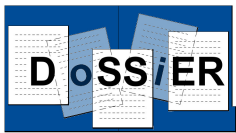




node.js based design

Developed Architecture





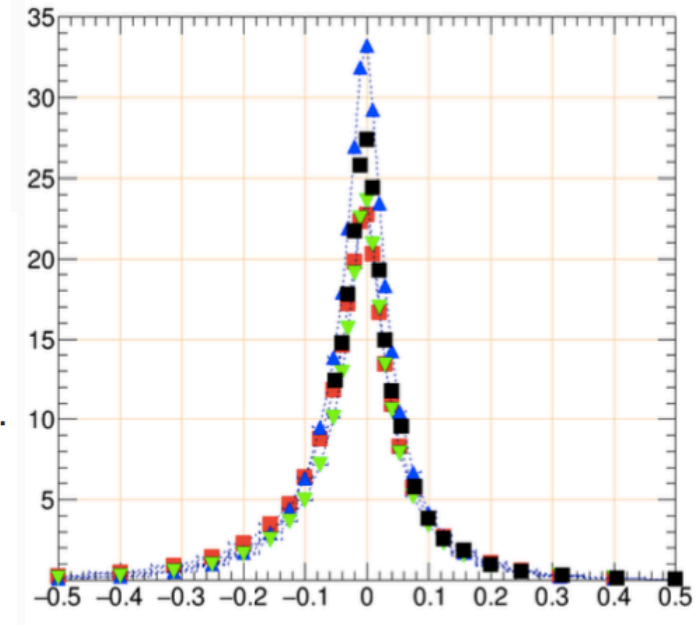
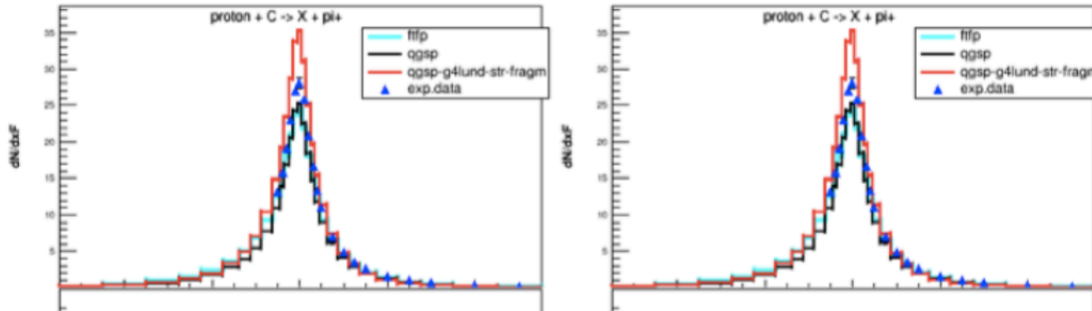
DbReader: How to use

- The library can be used from ROOT 6 macros or your C++ code can be linked with this library.

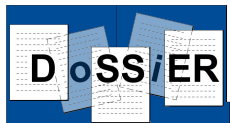
```
DbReader reader;  
TGraph* data = new TGraphAsymmErrors( reader.getByHTTP(183));  
data->SetMarkerSize(2);  
data->SetMarkerStyle(21);  
data->SetMarkerColor(kBlack);  
data->Draw("P");
```

DbReader: Testing

DbReader prototype is tested with Geant4 "test19" plotting macro. Replacing reading experimental data from file by reading from DOSSIER.



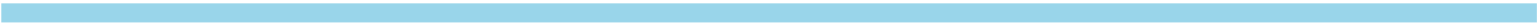
It is also tested by Julia

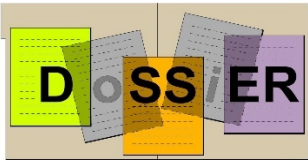


Summary



- Database ready to receive “Your” data. Let us know what you want in there. (cross link + provide uniform access also to other available db’s like INSPIRE, exfor, NIST,..?)
- Tools are in place to take formats supported by g4analysis and convert these to json → can be uploaded to the database (and vice versa).
- The one place to collect all data we use for validation → service provided to access programmatically.
- Two approaches to provide web service and web application.
- → give it a try and provide feed back!!!!

Backup





Choice of technologies

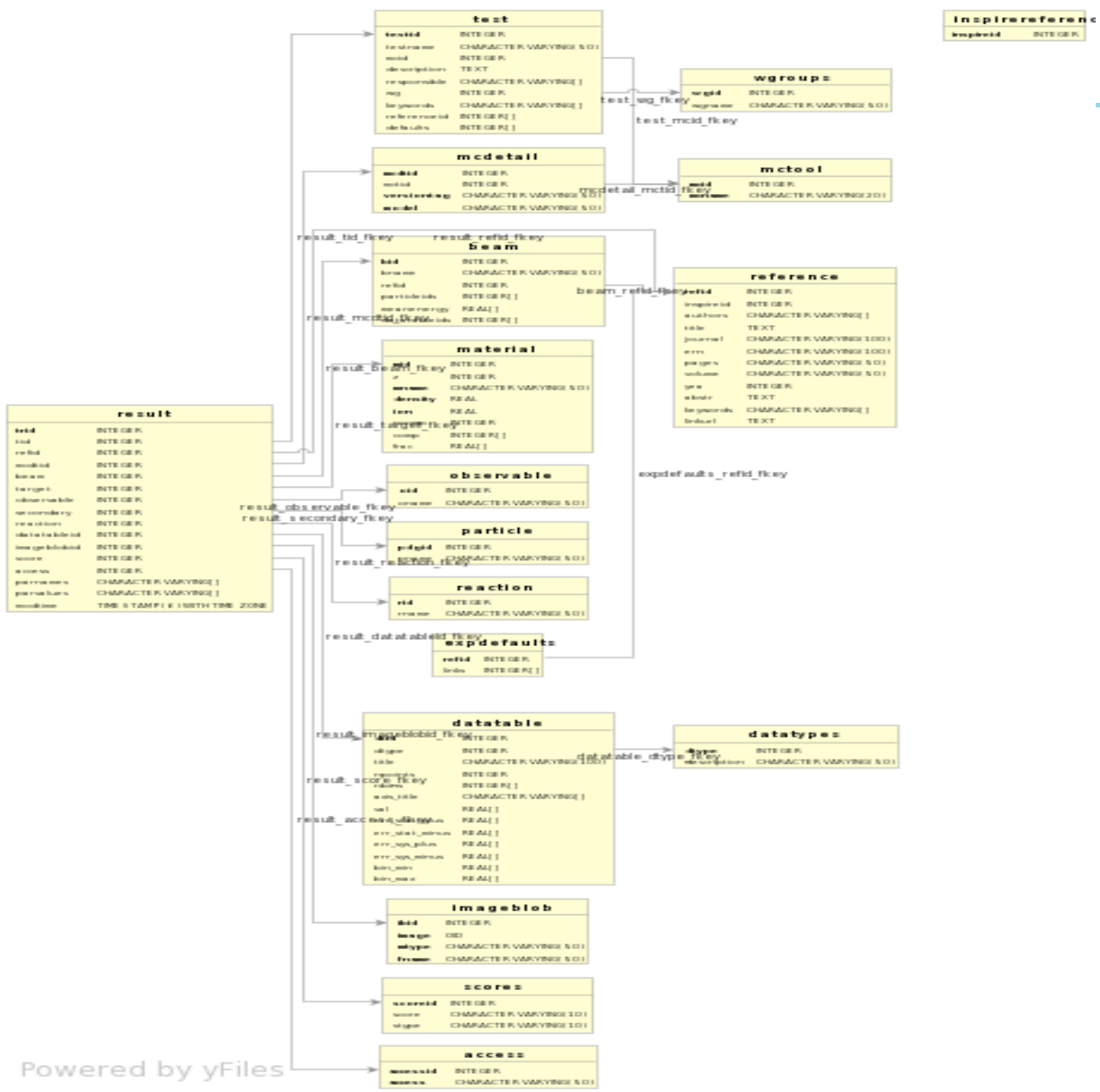
	Open source relational data base, hosted by Fermilab data base group.
	Glassfish: Web Application server hosted on fermicloud
	Primefaces JSF (Java Server Faces) based framework to create modern looking web pages and easy to navigate menus.
	Integrated Development Environment
	Java programming language, JAVAEE, JAX-RS
	JavaScript library used to create interactive graphs

Ancillary Tools

A set of stand-alone python based tools, integrated with DoSSiER are being developed to:

- allow for interaction from command-line or in applications with validation data.
- perform comparisons between results and simulations independently of web-application.
- integrate DoSSiER into Geant4 semi-automatic testing.

Focus is on simple and portable command line applications



Powered by yFiles

G4WebAppNG: Experimental data Browser

In addition to showing data as plots, one can select "Display data table", to extract the data in a tabulated form that is easy to cut and paste.

The screenshot shows the Geant 4 validation web application interface. The main content area displays a data table for the reaction $n + \text{Cu} \rightarrow \text{p} + \text{Secondary}$ at 54 degrees. The table lists the kinetic energy of the secondary proton (T/[MeV]) and the corresponding differential cross-section $d\sigma/d\Omega dT$ in $\mu\text{b}/\text{sr MeV}$, along with the error for each data point. The data points range from 35.0 MeV to 250.0 MeV.

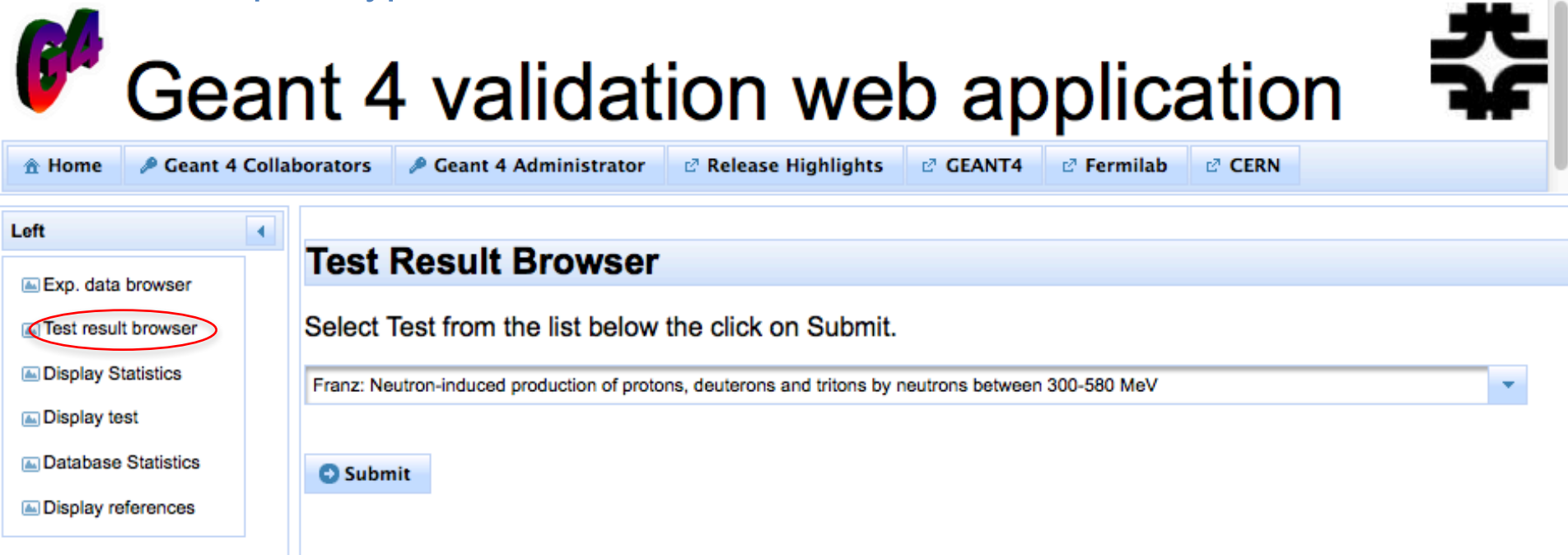
T/[MeV]	Error	$d\sigma/d\Omega dT$ [$\mu\text{b}/\text{sr MeV}$]	Error
35.0	0.0	914.7	30.63
37.0	0.0	754.7	26.43
39.0	0.0	687.4	24.57
45.0	0.0	680.2	15.99
55.0	0.0	570.8	13.69
65.0	0.0	387.3	9.645
75.0	0.0	306.9	7.911
85.0	0.0	276.5	7.357
95.0	0.0	273.6	7.449
105.0	0.0	297.0	8.163
115.0	0.0	242.7	7.043
125.0	0.0	208.5	6.372
135.0	0.0	213.8	6.668
145.0	0.0	190.1	6.231
155.0	0.0	189.1	6.412
165.0	0.0	175.2	6.191
175.0	0.0	148.1	5.605
185.0	0.0	121.8	5.005
195.0	0.0	113.9	4.879
205.0	0.0	93.89	4.384
215.0	0.0	76.08	3.908
225.0	0.0	67.83	3.684
235.0	0.0	57.85	3.504
250.0	0.0	45.22	2.251

Status: G4WebAppNG (predecessor of DoSSiER)

Can be found at the following URL:

<http://g4validation.fnal.gov:8080/G4WebAppNG/>

Based on prototype schema and API



The screenshot shows the web application interface for Geant 4 validation. At the top left is the G4 logo, and at the top right is the Fermilab logo. The main heading is "Geant 4 validation web application". Below this is a navigation bar with links: Home, Geant 4 Collaborators, Geant 4 Administrator, Release Highlights, GEANT4, Fermilab, and CERN. On the left side, there is a "Left" sidebar menu with the following items: Exp. data browser, Test result browser (circled in red), Display Statistics, Display test, Database Statistics, and Display references. The main content area is titled "Test Result Browser" and contains the instruction "Select Test from the list below the click on Submit." Below this is a dropdown menu with the selected text "Franz: Neutron-induced production of protons, deuterons and tritons by neutrons between 300-580 MeV". At the bottom of the main content area is a "Submit" button.