

CEDAR: HepData, JetWeb and Rivet

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ACAT 2007, NIKHEF, 2007-04-24

Outline

- 1 Intro
- 2 Event generation
- 3 HepData
- 4 Tuning
- 5 HepForge
- 6 Summary

CEDAR

- A collaborative project between UCL (London) and IPPP (Durham)
- “Collaborative e-Science Data Analysis Resource” (don't panic — I'll barely mention the Grid!)
- Central aim is tuning of MC event generators to data: *Rivet*, *RivetGun*
- Also data archival and presentation: *HepData*, *JetWeb*
- Also development tools: *HepForge*
- <http://www.cedar.ac.uk>

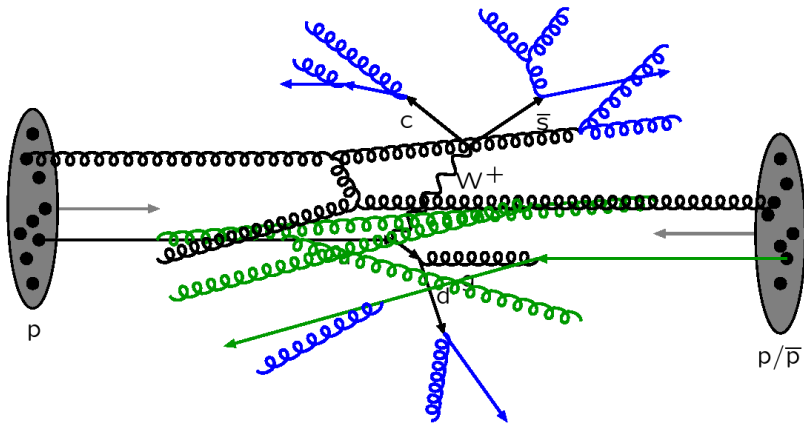


Event generation - in words

Modern Monte Carlo methods for event generation are complex and multi-faceted:

- Matrix element generation and phase space integration (LO, NLO)
- QCD radiation cascade: dipole shower, parton shower
- Hadronization and decays
- Underlying event: hard and soft
- Next generation of generators specialise in merging LO multi-parton and NLO ME results with parton showers: CKKW, MLM, MC@NLO...

Event generation - in pictures



Generator parameters

Since the generator models can't be exact, uncalculable parameters are unavoidable:

- Merging parton shower with ME
- Cluster fragmentation mass / Lund params
- Flavour generation in hadronization
- Jet definition in multi-jet/ME merging
- Endpoint of parton cascade (p_{Tmin} / angular cutoff)
- Proton density functions
- Proton matter distribution (for UE modelling)

Models using these parameters need to be validated using **real data**.

The real data: HepData

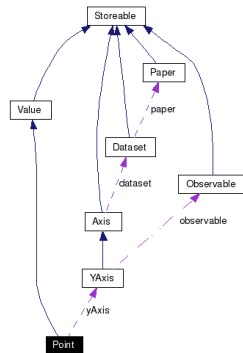
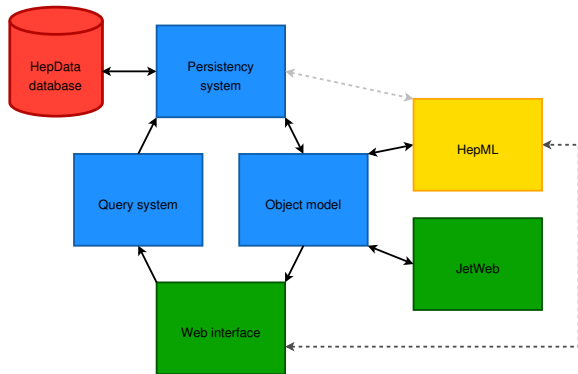
- Established archive of published HEP data from $\mathcal{O}(30\text{yrs})$
- Concentrates on cross-sections and similar distributions — PDG RPP covers “single figure” measurements such as branching ratios, asymmetries. . .
- Legacy database is being upgraded from FORTRAN-accessed BDB to a modern relational database
- <http://projects.hepforge.org/hepdata>

HepData upgrade

- New version handles data more semantically via a Java 5 object model
- Object-relational mapping via Hibernate (DB) and Castor (XML)
- New front-end via Java servlets/Tapestry, build and deployment by Maven
- Data plotting/export via (J)AIDA
- User input of data will be more direct: HepML / Web form. Grid authentication?
- Currently useable internally on a per-paper basis — HepML-based migration to a complete database approaching completion



New HepData structure and interaction



Rivet: a new tuning framework

And now back to the tuning:

- Rivet is a C++ replacement for FORTRAN HZTool
- Combination of tools, analysis handler and analyses
- Structure based on auto-cached **Projections** acting on HepMC events
- **Analysis** routines use projections to make distributions
- Binning, optional histogramming etc. via AIDA interfaces
- Comes bundled with a HepData-exported AIDA XML file for each analysis - histograms can be auto-booked with correct binnings
- <http://projects.hepforge.org/rivet>

A Rivet Projection

Multiplicity.hh

```
class Multiplicity : public Projection {
public:
    inline Multiplicity(FinalState& fsp) : ..., _fsproj(&fsp) { }

    inline string name() const { return "Multiplicity"; }

    inline const unsigned int totalMultiplicity() const {
        return _totalMult; }

protected:
    void project(const Event & e);

    int compare(const Projection & p) const;

private:
    unsigned int _totalMult, ...;

    FinalState* _fsproj;
};
```

A Rivet Projection

Multiplicity.cc

```
int Multiplicity::compare(const Projection& p) const {
    const Multiplicity& other = dynamic_cast<const Multiplicity&>(p);
    return memcmp(*fsproj, *other.fsproj);
}

void Multiplicity::project(const Event& e) {
    Log& log = getLog();
    log << Log::DEBUG << "Getting multiplicity" << endl;

    const FinalState& fs = e.applyProjection(*fsproj);
    _totalMult = fs.particles().size();
}
```

A Rivet Analysis

TestAnalysis.hh

```
class TestAnalysis : public Analysis {
public:
    inline TestAnalysis() : p_mult(p_fs), p_thrust(p_fs) { }

    inline string name() const { return "Test"; }

    void init();

    void analyze(const Event & event);

    void finalize();

private:
    FinalState p_fs;

    Multiplicity p_mult;

    AIDA::IHistogram1D* _histTot;
};
```

A Rivet Analysis

TestAnalysis.cc

```
// Book histograms
void TestAnalysis::init() {
    _histTot = bookHistogram1D("TotalMult", "Total multiplicity",
                              100, -0.5, 999.5);
}

// Do the analysis
void TestAnalysis::analyze(const Event& event) {
    Log log = getLog();
    log << Log::DEBUG << "Starting analyzing" << endl;

    const Multiplicity& m = event.applyProjection(p_mult);
    log << Log::INFO << "Total multiplicity = "
        << m.totalMultiplicity() << endl;
    _histTot->fill(m.totalMultiplicity(), event.weight());
}

// Finalize
void TestAnalysis::finalize() { } //< e.g. normalize histos
```

RivetGun

- RivetGun is an executable which steers generators and runs Rivet analyses
- Isolates the generator steering from Rivet (cf. HZSteer)
- Generators accessed through OO wrappers: library called **AGILe**: “A Generator Interface Library (+ e)”
- Current “static” version can only be built against libraries which avoid symbol clashes
- Final version will use **dlopen/lt_d1** to dynamically load requested generator libraries - no symbol restrictions
- Supported generators: FHerwig, FPythia, AlpGen, Sherpa, Herwig++, Pythia8

A RivetGun session

- Generate events and run generator using RivetGun:

```
$ rivetgun-static -g FPythia -n 50000  
-a HEPEX0409040  
-beam1 PROTON -mom1 980  
-beam2 ANTIPROTON -mom2 980  
-P fpythia.params -l RivetGun:WARN
```
- Read event files with JAS, PAIDA or other tool:

```
$ jas3 Rivet.aida
```

Rivet and RivetGun are built with GNU autotools. Some dependencies, which can be handled with a bootstrapping script for now, packaging later.

JetWeb

The last part of “CEDAR-proper” is an archive of simulated analysis results, indexed by model parameters: **JetWeb**

- Java-based: uses MySQL and Apache Tomcat as a back-end
- AIDA rendering of distributions
- Obtains reference data direct from HepData using HD object model
- Can generate processes / extra stats on Web-user request
- Grid-based distribution of simulation jobs



JetWeb screenshots - searching

The screenshot shows the JetWeb interface in a browser window. The address bar displays the URL `http://jetweb.cedar.ac.uk/jetweb-webapp/JWSearch`. The page features a navigation menu on the left with links to Home, News Items, Bibliography, and Developers. The main content area includes search fields for Fit ID and Model ID, a file upload section, and several control buttons like Get Models, Select plots, and View Processes. A section titled 'Common parameters' lists various physics models and their selection status.

Common parameters

Generator	6507	6510	6206	6326	6404	6406	Photon PDF	Proton PDF
herwig	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	GRV-G LO <input type="checkbox"/>	CTEQ 5L <input type="checkbox"/>
pythia	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SaS-G 2D (ver.2) LO <input type="checkbox"/>	CTEQ 6LL <input checked="" type="checkbox"/>
							SaS-G 1D (ver.2) LO <input type="checkbox"/>	ZEUS2005 <input type="checkbox"/>
							WHIT-G 2 LO <input type="checkbox"/>	MRST2004nnlo <input checked="" type="checkbox"/>
							GRV-G HO <input checked="" type="checkbox"/>	CTEQ6m <input type="checkbox"/>
							DIS NLO <input checked="" type="checkbox"/>	

JetWeb screenshots - models

The screenshot shows a web browser window titled "JetWeb - CEDAR" with the URL <http://jetweb.cedar.ac.uk/jetweb-webapp/JWSearch>. The page features the CEDAR logo and a navigation menu with the following items: CEDAR, HEPDATA, JETWEB, HEPFORGE, and HEPML. A sidebar on the left contains a list of links: Home, News Items, Bibliography, and Developers. The main content area displays five model entries, each with a model ID, generator, PDFs, and a description, along with a "Full details" link.

Model ID	Generator	Photon PDF	Proton PDF	Description
1	herwig-6510	GRV-G HO DIS NLO	MRST2004nnlo	Atlas tune with MRST 2004 nnlo PDF Full details
5	herwig-6510	GRV-G HO DIS NLO	CTEQ 6LL	Atlas tune Full details
3	herwig-6510	GRV-G HO DIS NLO	MRST2004nnlo	CDF tune A Full details
4	herwig-6510	GRV-G HO DIS NLO	MRST2004nnlo	null Full details
2	herwig-6510	GRV-G HO DIS NLO	MRST2004nnlo	Herwig default Full details

JetWeb screenshots - papers

JetWeb - CEDAR

http://jetweb.cedar.ac.uk/jetweb-webapp/JWSearch

Minimum Bias 820.0p_27.5e+ data
Nothing generated for this process type.

High ET 820.0p_27.5e+ data

	RunSeries ID: 12 Luminosity: 1.785E0pb ⁻¹ Log Files		
	RunSeries ID: 22 Luminosity: 0E0pb ⁻¹ Log Files		
	RunSeries ID: 23 Luminosity: 0E0pb ⁻¹ Log Files		
	RunSeries ID: 24 Luminosity: 0E0pb ⁻¹ Log Files		
Generated samples for this process type			Hide papers
Energy Flow and Rapidity Gaps Between Jets in Photoproduction at HERA	SPIRES Reference	Plots	H1 Eur. Phys. J C24 (2002) 4, 517-527, 03/02
Measurement of Dijet Cross Sections in Photoproduction at HERA	SPIRES Reference	Plots	H1 Eur.Phys.J.C25:13-23,2002
Multijet Photoproduction	SPIRES Reference	Plots	ZEUS Acta Phys.Polon.B33:3123-3128,2002; ICHEP 2002 Abstract 849

JetWeb screenshots - plots

JetWeb - CEDAR

http://jetweb.cedar.ac.uk/jetweb-webapp/JWSearch

CEDAR **HepDATA** **JetWeb** **HepForge** **HepML**

- Home
- News Items
- Bibliography
- Developers

ID:1 Inclusive Jet Differential Cross Sections in Photoproduction at HERA **SPIRES Reference**
 Code author(s): Mark Hayes Contact: hztool@cedar.ac.uk
Jet transverse energy above 11 GeV

Jet transverse energy above 11 GeV

Vector output of plotted data

The default process type for this data is

ID: 2 High ET in
 820.0 GeV p - 27.5 GeV e+ collisions. [More](#)

[More](#)

Tuning with Rivet

- As so often happens, params are highly correlated
- So no point in tuning one param at a time. . .
- We have a high-dimensional parameter space, $n > \mathcal{O}(10)$
- Data from LEP, RHIC, HERA, (Tevatron)
- Expt data should be corrected back to final state particle level to be really useful — not “parton level”! PGS?
- Delphi tuning: fit MC results to quadratic in n variables:

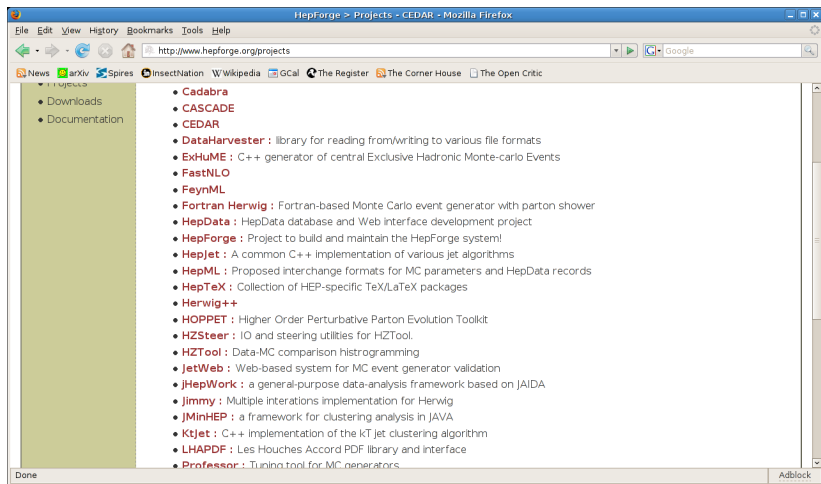
$$X_{MC}(\vec{p}) = A_0 + \sum_{i=1}^n B_i p_i + \sum_{i=1}^n \sum_{j=i}^n C_{ij} p_i p_j$$

- Being reimplemented with Rivet machinery: AB + Hendrick Hoeth (Wuppertal) + Dresden group

HepForge

- Online development environment for free HEP projects (mainly for CEDAR, but supported)
- For those who want to provide quality multi-use software for HEP (and who don't find what they want in CERN's Savannah installation)
- Subversion version control, Trac issue tracker/wiki/SVN browser, Mailman mailing lists, Web space, shell account, backups, downloads management. . .
- We don't provide large volume storage or CPU resources, though!
- Currently about 40 projects, 80 users

HepForge screenshots - projects list



HepForge screenshots - downloads system

The screenshot shows a web browser window displaying the HepForge downloads page for the Pythia 6 project. The page has a navigation menu on the left and a main content area with two tables of download links.

HepForge downloads

[Back to project list...](#)

Pythia 6 project:

Name	Version	Filename
pythia	6.4.11	pythia-6.4.11.f.gz (539k)
	6.4.10	pythia-6.4.10.tar.gz (605k)
	6.4.9	pythia-6.4.09.tar.gz (591k)
	6.4.8	pythia-6.4.08.tar.gz (591k)
	6.4.6	pythia-6.4.06.tar.gz (575k)
	6.4.5	pythia-6.4.05.tar.gz (570k)
	6.4.4	pythia-6.4.04.tar.gz (562k)
	6.4.3	pythia-6.4.03.tar.gz (560k)
	6.4.2	pythia-6.4.02.tar.gz (562k)

Name	Version	Filename
update_notes	6.4.11	update_notes-6.4.11.txt (30k)
	6.4.10	update_notes-6.4.10.txt (24k)
	6.4.9	update_notes-6.4.09.txt (20k)
	6.4.8	update_notes-6.4.08.txt (20k)

HepForge screenshots - a project Web page

The screenshot shows a Mozilla Firefox browser window displaying the LHAPDF project page. The address bar shows the URL `http://projects.hepforge.org/lhapdf/`. The page title is "LHAPDF the Les Houches Accord PDF Interface".

Home

LHAPDF provides a unified and easy to use interface to modern PDF sets. It is designed to work not only with individual PDF sets but also with the more recent multiple "error" sets. It can be viewed as the successor to PDFLIB, incorporating many of the older sets found in the latter, including pion and photon PDFs. In LHAPDF the computer code and input parameters/grids are separated thus allowing more easy updating and no limit to the expansion possibilities. The code and data sets can be downloaded together or individually as desired. From version 4.1 onwards a configuration script facilitates the installation of LHAPDF.

Contents:

- Installing LHAPDF.
- List of all available PDF sets.
- On-line user manual.
- A wrapper for C++.
- A little bit of theory.
- Description of the .LHpdf files
- PDFsets.LHtext
- How to join the mailing list.
- View the Subversion repository.
- Tracker/Wiki
- ChangeLog.

Downloads:

- Pre-release version:
 - 5.3.0 (full): `lhpdf-5.3.0.tar.gz`
- Latest released version:
 - 5.2.3 (full): `lhpdf-5.2.3.tar.gz`
 - 5.2.3 (no pdf files): `lhpdf-5.2.3-nopdf.tar.gz`
- Old versions:
 - 5.2.2 (full): `lhpdf-5.2.2.tar.gz`
 - 5.2.1 (full): `lhpdf-5.2.1.tar.gz`
 - 5.2 (full): `lhpdf-5.2.tar.gz`
 - 5.1 (full): `lhpdf-5.1.tar.gz`
 - 5.0.0 (full): `lhpdf-5.0.0.tar.gz`

The browser's status bar at the bottom shows the URL `http://projects.hepforge.org/lhapdf/ChangeLog`.

HepForge screenshots - a project wiki

The screenshot shows a web browser window displaying the Rivet issue tracker wiki page. The browser's address bar shows the URL `http://projects.hepforge.org/rivet/trac/wiki/GettingStarted`. The page title is "GettingStarted - Rivet - HepForge - Mozilla Firefox".

The page content includes a sidebar with a navigation menu:

- Rivet home
 - HZTool
 - RivetGun
- Subversion
- Documentation
 - Getting started
 - API documentation
 - HepMC API
- Project Planning
 - Tickets
 - Timeline
- Contact

The main content area features a search bar and navigation tabs: "Wiki" (selected), "Timeline", "Roadmap", "Browse Source", "View Tickets", and "Search". Below the tabs are links for "Start Page", "Index by Title", "Index by Date", and "Last Change".

The page title is "Rivet issue tracker". Below it, there are links for "Login", "Settings", "Help/Guide", and "About Trac".

The main heading is "Getting started with Rivet". The text below it states: "These instructions are aimed at users who want to install and run a release of Rivet. [GettingStartedForDevelopers](#) has some additional or replacement steps for people wishing to check out the development version from the repository and build from there."

The next section is "Rivet installation instructions". The text reads: "Create a directory (e.g. named `$HOME/cedar/local`) to contain the created libraries. Remember also to include the `$HOME/cedar/local/lib` absolute path in your `LD_LIBRARY_PATH` environment variable."

A bolded section header asks: "Question from Jon - is this really needed?".

The text continues: "First install the related packages; (if they are installed already on your system, you can use them as long as you tell the Rivet configuration where they are)."

A numbered list item says: "1. CLHEP version 2.0.3.1 from `⇒ http://proj-clhep.web.cern.ch/proj-clhep/` then do:"

A code block contains the following commands:

```
tar xvzf clhep-2.0.3.1.tgz
mv 2.0.3.1 clhep2.0.3.1}} (optionally)
cd clhep2.0.3.1/CLHEP
```

The browser's status bar at the bottom shows the URL `http://projects.hepforge.org/rivet/trac/wiki/GettingStarted` and an "Adblock" extension icon.

HepForge screenshots - SVN browser

The screenshot shows a Mozilla Firefox browser window displaying the HepForge SVN browser interface for the `trunk/src/Analysis` directory. The browser's address bar shows the URL `http://projects.hepforge.org/rivet/trac/browser/trunk/src/Analysis`. The page title is `/trunk/src/Analysis - Rivet - HepForge - Mozilla Firefox`.

The interface includes a navigation menu on the left with the following items:

- Rivet home
 - HZTool
 - RivetGun
- Subversion
- Documentation
 - Getting started
 - API documentation
 - HepMC API
- Project Planning
 - Tickets
 - Timeline
- Contact

The main content area displays the **Rivet issue tracker** and navigation options: `Wiki`, `Timeline`, `Roadmap`, `Browse Source` (selected), `View Tickets`, and `Search`. There are also links for `Login`, `Settings`, `Help/Guide`, and `About Trac`.

The current directory path is `root / trunk / src / Analysis`. Below this, there is a table listing the files in the directory:

Name	Size	Rev	Age	Last Change
Analysis.cc	2.8 kB	248	17 minutes	buckley: Made hierarchical logging work, reinstated and debugged the PRD analysis
HepEx0112029.cc	1.2 kB	224	2 weeks	buckley: Started replacing the <code>RivetInfo</code> class with a two-part system for combining .
HepEx0409040.cc	8.1 kB	246	4 days	lonnblad: The reason this did not compile under gcc-4 is that some iterators into a .
HepEx9506012.cc	3.9 kB	225	2 weeks	buckley: Some renamings and removal of cruft. <code>RivetGun</code> needs updates of all the .
Makefile.am	211 bytes	248	17 minutes	buckley: Made hierarchical logging work, reinstated and debugged the PRD analysis
PL273B181.cc	2.5 kB	224	2 weeks	buckley: Started replacing the <code>RivetInfo</code> class with a two-part system for combining .
PRD65092002.cc	3.5 kB	248	17 minutes	buckley: Made hierarchical logging work, reinstated and debugged the PRD analysis
TestAnalysis.cc	2.7 kB	224	2 weeks	buckley: Started replacing the <code>RivetInfo</code> class with a two-part system for combining .

Below the table, there is a note: `Property svn:ignore set to .deps`. The browser's status bar at the bottom shows the URL `http://projects.hepforge.org/rivet/trac/log/trunk/src/Analysis/Analysis.cc`.

HepForge screenshots - SVN change log

View changes

	Rev	Chgset	Date	Author	Log Message
⌂	[248]	[248]	23/04/07 14:42:26	buckley	Made hierarchical logging work, reinstated and debugged the PRD analysis ...
⌂	[242]	[242]	19/04/07 14:47:03	buckley	Lars' normalisation changes
⌂	[241]	[241]	18/04/07 18:22:16	buckley	Fixed problem with erase invalidating list iterators.
⌂	[232]	[232]	16/04/07 13:45:31	buckley	Added missing implementation of the Analysis.book-histogram1 divector of bin
⌂	[225]	[225]	12/04/07 17:19:33	buckley	Some renamings and removal of cruft. RivetGun needs updates of all the ...
⌂	[224]	[224]	12/04/07 16:00:25	buckley	Started replacing the RivetInfo class with a two-part system for combining ...
⌂	[216]	[216]	03/04/07 16:49:15	sonne	D0 azimuthal jet correlations analysis added, CalMET, conejet and primary ...
⌂	[205]	[205]	23/03/07 13:43:26	buckley	Rehacked the AIDA declarations to break transitive header dependencies
⌂	[204]	[204]	23/03/07 11:23:53	buckley	Added convenience getLog method to the Analysis class
⌂	[176]	[176]	06/03/07 19:48:17	buckley	Added iteration over analysis enums and names and both-ways associative ...
⌂	[174]	[174]	03/03/07 17:16:53	jmb	fixed histogramming booking runtime error
⌂	[173]	[173]	02/03/07 12:45:20	buckley	Merged all .icc files into .jh, updated KJets? dependence to point at ...
⌂	[167]	[167]	27/02/07 16:33:24	jmb	First version analysis looping on KJets? (D.Voong/JMB)
⌂	[152]	[152]	10/02/07 12:37:38	buckley	Added book-histogram method to Analysis, which can be used to auto-generat
⌂	[142]	[142]	06/02/07 16:42:34	allott	Added sphericity tensor projection and a test analysis which uses it.
⌂	[139]	[139]	31/01/07 16:16:58	buckley	Added ALEPH charged multiplicity HepML file

HepForge screenshots - SVN changeset

Diff r242:r248 for trunk/src/Analysis/Analysis.cc - Rivet - HepForge - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://projects.hepforge.org/rivet/trac/changeset?new=trunk%2Fsrc%2FAnalysis%2FAnalysis.cc%40248&old=trunk%2Fsrc%2FAnalysis%2FAnalysis.cc%40242

News arXiv Spire InsectNation Wikipedia GCal The Register The Corner House The Open Critic

Unmodified Added Removed Modified Copied Moved

trunk/src/Analysis/Analysis.cc

r242	r248
8	8
9	9
10	10
11	11
12	12
...	...
27	27
28	28
29	29
30	30
31	29
32	30
33	31
34	32
35	35
36	36
37	33
38	34
39	35
40	36
40	37
40	38
40	39
40	40

```

#include "Rivet/Analysis/HepEx9506012.hh"
#include "Rivet/Analysis/HepEx0112029.hh"
// #include "Rivet/Analysis/PRD65092002.hh"
#include "Rivet/Analysis/PRD65092002.hh"
#include "Rivet/Analysis/HepEx0409040.hh"
#include "Rivet/Tools/Logging.hh"

...

case ANALYSIS_TEST:
return *(new TestAnalysis());
case ANALYSIS_PL2738181:
return *(new PL2738181());
case ANALYSIS_HEPEX9506012:
return *(new HepEx9506012());
case ANALYSIS_HEPEX0112029:
return *(new HepEx0112029());
// case ANALYSIS_PRD65092002:
// return *(new PRD65092002());
case ANALYSIS_HEPEX0409040:
return *(new HepEx0409040());
case ANALYSIS_PL2738181:
return *(new PL2738181());
case ANALYSIS_PRD65092002:
return *(new PRD65092002());
}
throw runtime_error("Tried to get an analysis not known in the

```

Done Adblock

Durham University

HepForge screenshots - project tickets

{3} All Tickets by Milestone (22 matches)

Results ordered by priority and grouped by milestone.

First public release

Ticket	Summary	Component	Version	Type	Owner	Created
#64	Get make distcheck working properly	General		defect	buckley *	20/04/07
#67	Change analysis command line options	General		enhancement	buckley *	20/04/07
#57	Convert RivetInfo to use enumerated values	Steering		task	buckley *	04/04/07
#33	Define conventions for accessing and storing data histograms	Histogram	0.1	task	buckley *	09/02/07

Perfection

Ticket	Summary	Component	Version	Type	Owner	Created
#16	Remove dependency on CLHEP	Projections	0.1	enhancement	buckley *	12/10/06
#26	Provide Vector and Matrix classes	General	2.0	task	buckley *	29/11/06
#43	Review license compatibility with TinyXML	General		task	all	07/03/07
#15	Add SLD and LEP B fragmentation analyses	Analysis	1.0	task	buckley *	28/09/06
#22	Use smart pointers	General	0.1	enhancement	buckley *	15/11/06
#32	Make histogram package pluggable	Histogram	1.0	enhancement	waugh	24/01/07
#41	Provide an interface to root.	Analysis	0.1	enhancement	buckley	03/03/07

Summary

- Rivet/RivetGun system provides a unified mechanism to re-generate expt analysis distributions with MC models
- HepData archive is being re-written and is used as a data source for Rivet and JetWeb (plus others in future?). Java-based re-write has proceeded well and many good tools have been identified on the way.
- JetWeb generates and archives Rivet/HZTool distributions with a Web interface
- HepForge accounts are available for suitable projects (current list includes, Herwig++, Sherpa, LHAPDF... ~40 in total)
- Rivet will be combined with the Professor tuning system to automatically tune generators based on Rivet/HepData mechanisms

Status

- Rivet / RivetGun beta releases for version 0.9 available. Full 1.0 release in next few months: more analyses, projections, stable API.
- HepData new object model and persistency almost complete - migration completed soon. Work is progressing on the UI re-engineering and the search mechanism (Hibernate + ANTLR)
- JetWeb is now available again, with large-scale restructuring “under the hood”.
- HepForge’s management system is being re-written in Python for greater reliability. Otherwise stable.
- Professor+Rivet being developed from now by AB + H. Hoeth + Dresden HEP