

The ROOT Project

<http://root.cern.ch>

Rene Brun
CERN/PH

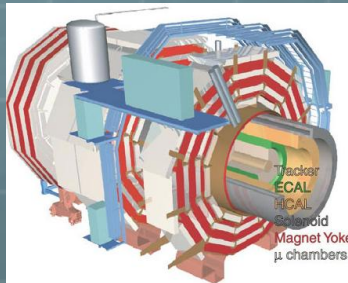
ROOT in a mini nutshell

- 🌐 Open Source Project started in 1995
- 🌐 The corner stone for LHC and HEP software
- 🌐 To create, query, analyze, visualize huge data bases
- 🌐 Runs on Linux, MAC, Windows

ROOT in a Nutshell

- The ROOT system is an Object Oriented framework for large scale data handling applications. It is written in C++.
- Provides, among others,
 - an efficient data storage and access system designed to support structured data sets (PetaBytes)
 - a query system to extract data from these data sets
 - a C++ interpreter
 - advanced statistical analysis algorithms (multi dimensional histogramming, fitting, minimization and cluster finding)
 - scientific visualization tools with 2D and 3D graphics
 - an advanced Graphical User Interface
- The user interacts with ROOT via a graphical user interface, the command line or scripts
- The command and scripting language is C++, thanks to the embedded CINT C++ interpreter, and large scripts can be compiled and dynamically loaded. A Python shell is also provided.

ROOT Application Domains



Data Analysis & Visualization



General Framework



Data Storage: Local, Network

ROOT: An Open Source Project

The project was started in 1995.

The project is developed as a collaboration between:

Full time developers:

- 8 people full time at CERN (PH/SFT)
- +2 developers at Fermilab/USA

Large number of part-time contributors (187 in CREDITS)

A long list of users giving feedback, comments, bug fixes and many small contributions

- 4800 registered to RootForum
- 10,000 posts per year

An Open Source Project, source available under the LGPL license

License(s)

LGPL

ROOT libraries
106 packages

Plug-in manager

GPL

MathMore

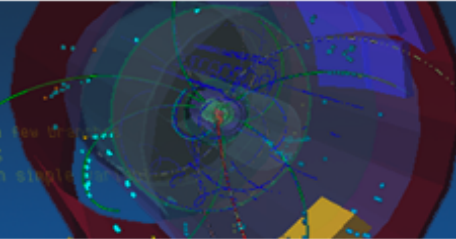
GSL

Optional
GNU Scientific Library



ROOT

```
//create the file, the Tree and a new file
TFile f("tree1.root","recreate");
TTree t1("t1","a simple Tree with simple");
t1.Branch("px",&px,"px/F");
t1.Branch("py",&py,"py/F");
```



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Screenshots

Get a taste of ROOT's capabilities by sampling some screenshots.



Download

Go ahead and [download](#) the latest build of ROOT.



Documentation

Get the inside scoop on how to fully utilize ROOT. Also, search the Reference Guide, the How To's and the user forums.

What's New

- March 31, 2010, 15:34
Patch release 5.22/00i
- January 22, 2010, 17:44
Patch release 5.22/00g
- January 20, 2010, 12:14
Patch release 5.26/00a
- December 15, 2009, 10:21
Production release 5.26/00

Development release 5.27/06

development release

The development release of ROOT 5.27/06 is now available.

The SVN tag for this version is **v5-27-06**.

See the [release notes](#) for what is new in the version 5.27/06 development release.

[Read more](#)

Patch release 5.26/00d

patch release

The patch release of ROOT 5.26/00d is now available.

The SVN tag for this version is **v5-26-00d**.

For what is fixed in this patch release see the [patch release notes](#).

[Read more](#)

Patch release 5.22/00i

patch release

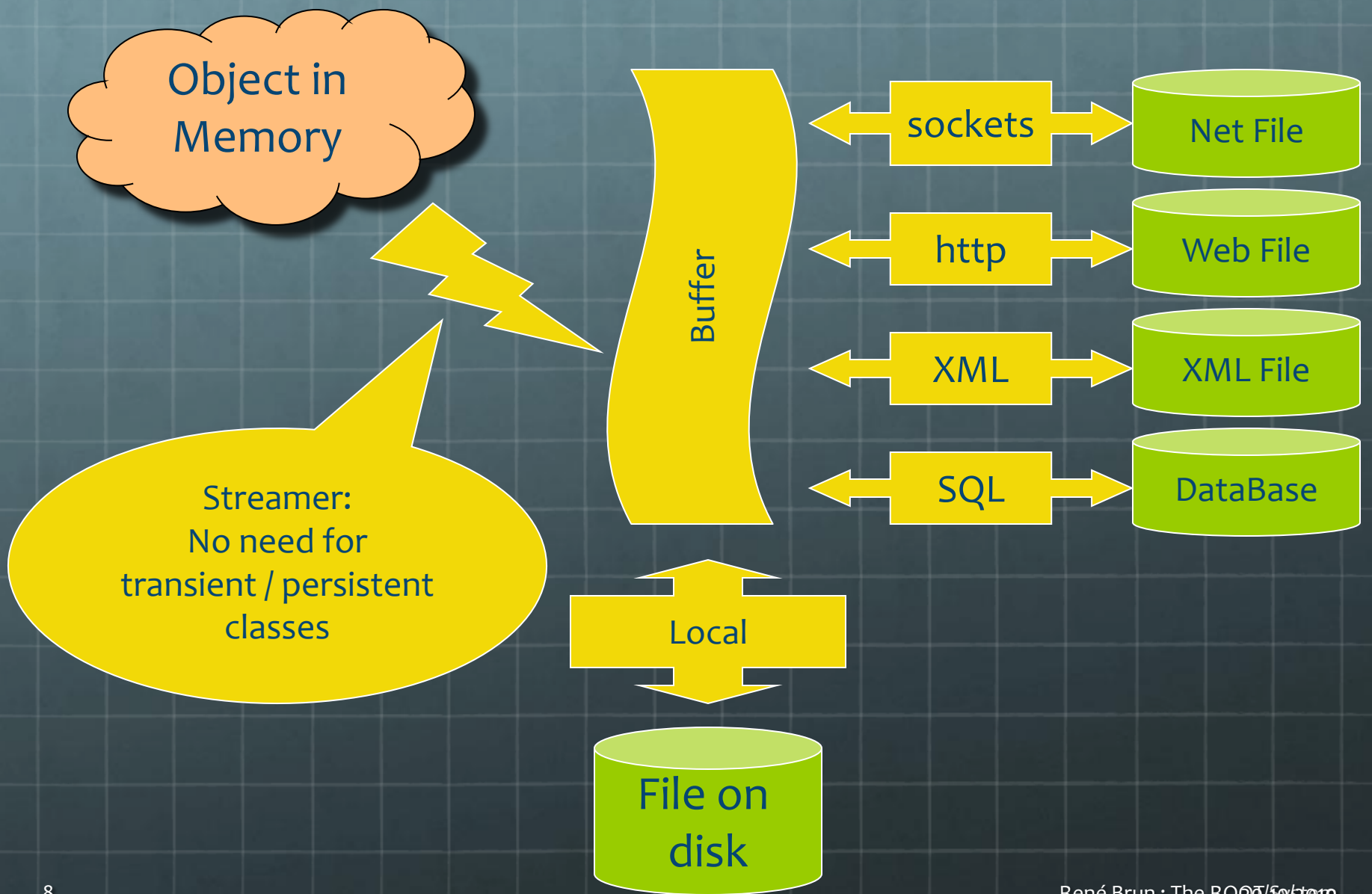
The patch release of ROOT 5.22/00i is now available.

Recent blog posts

- New server and code poetry
- C++ 0x draft published
- Incredible India
- Spin little disk, spin!
- C++ Discussion with

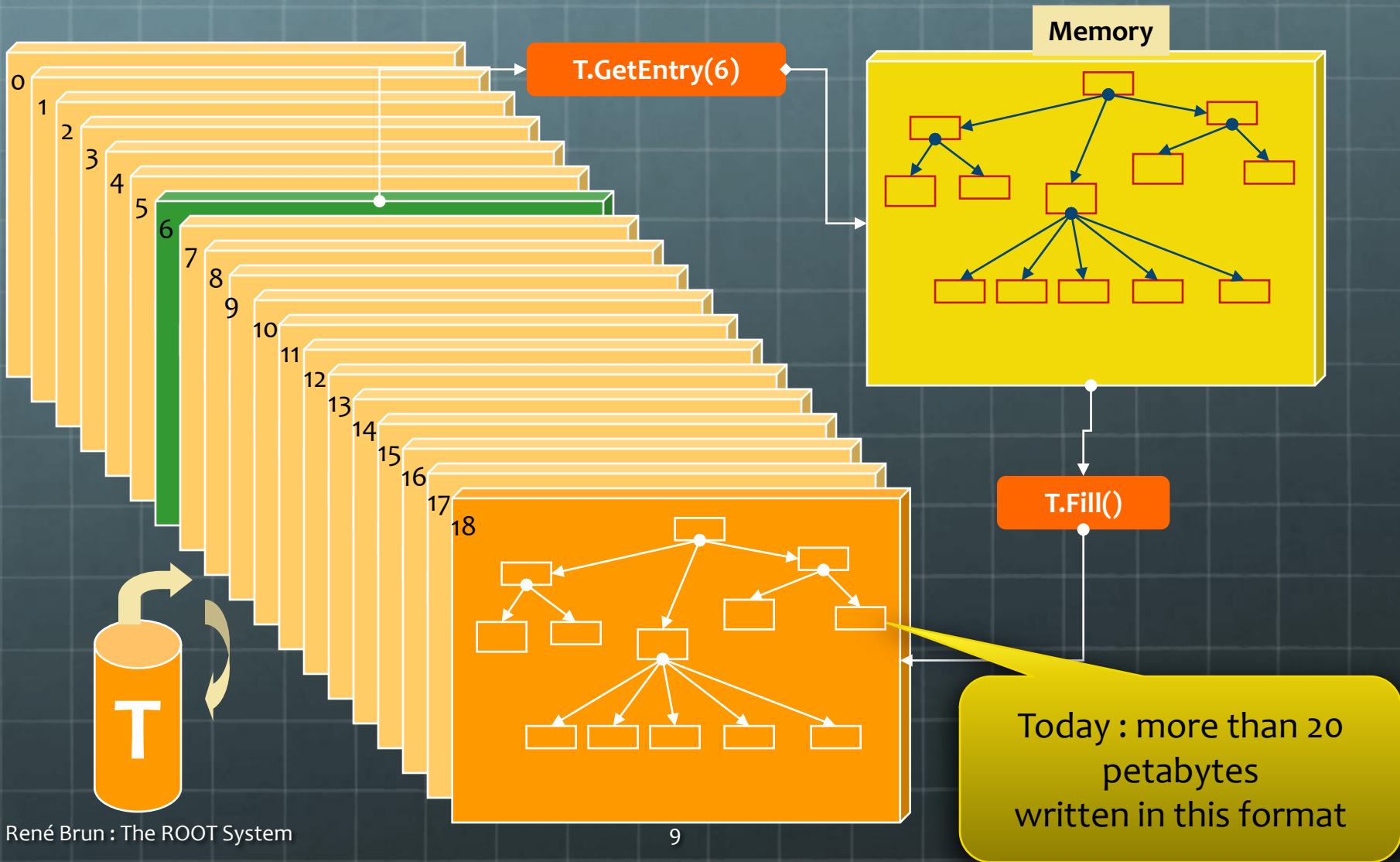
<http://root.cern.ch>

I/O



Memory <--> Tree

Each Node is a branch in the Tree



Browsing a TTree with TBrowser

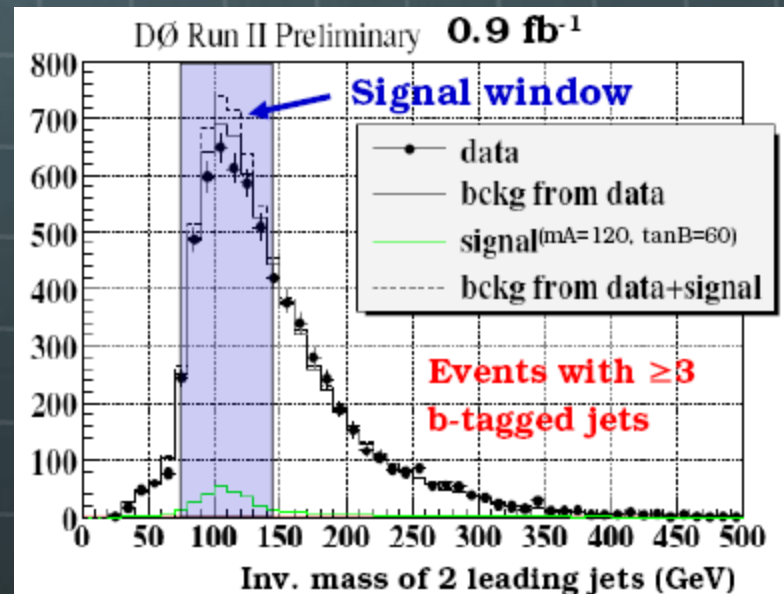
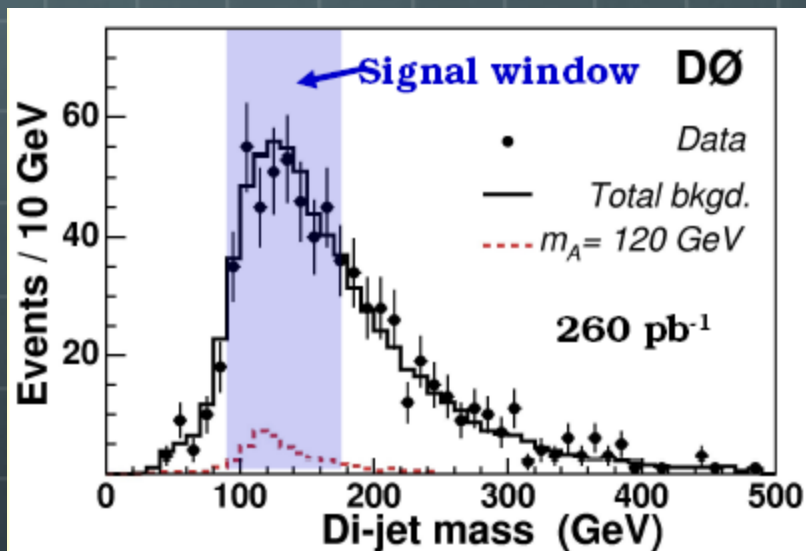
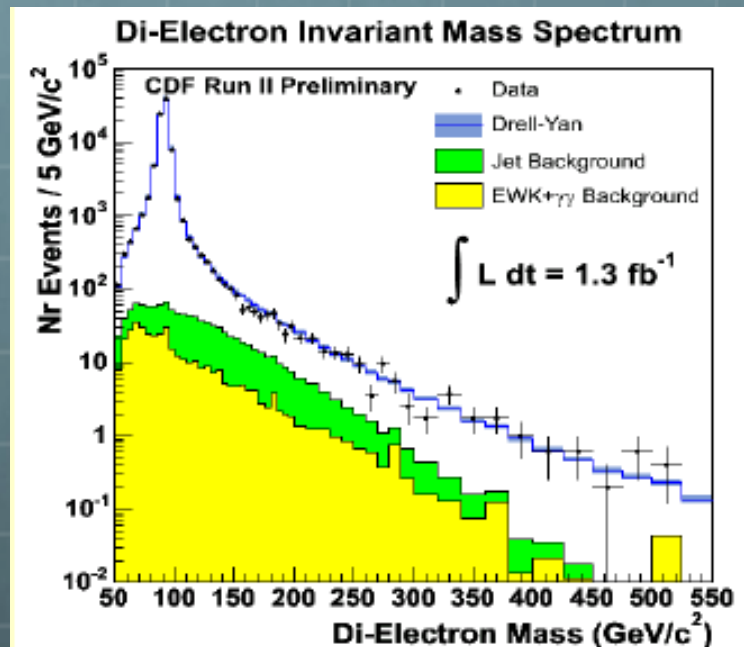
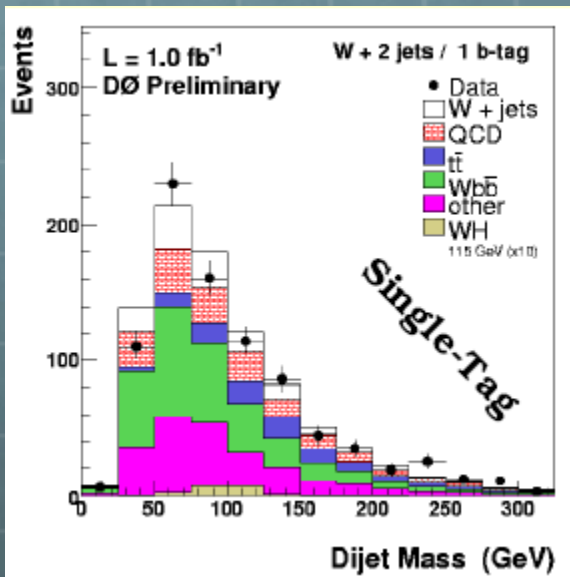
The screenshot shows the ROOT Object Browser interface. The title bar reads "ROOT Object Browser". The menu bar includes "File", "View", and "Options". The current directory is "Electrons". The left pane shows a tree structure of folders, with "Electrons" selected under "T". The right pane shows the contents of the "Electrons" folder, listing 8 files: "Electrons.fBits", "Electrons.fUniqueID", "Electrons.m_Eta", "Electrons.m_KFcode", "Electrons.m_KFmother", "Electrons.m_MCParticle", "Electrons.m_PT", and "Electrons.m_Phi".

Annotations:

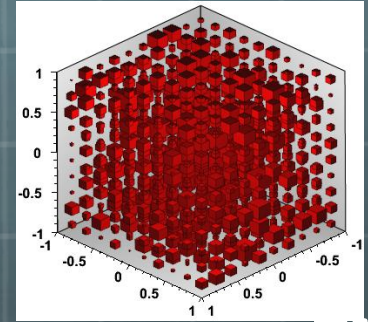
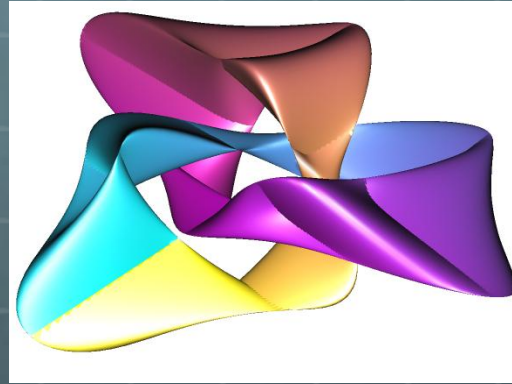
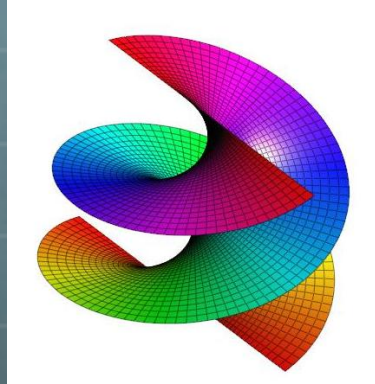
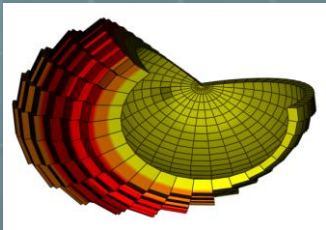
- A blue speech bubble with a water droplet pattern contains the text "8 leaves of branch Electrons". A yellow arrow points from this bubble to the "Electrons" folder in the left pane.
- A yellow speech bubble contains the text "A double click To histogram The leaf". A yellow arrow points from this bubble to the "Electrons.m_PT" file in the right pane.
- A yellow speech bubble contains the text "8 branches of T". A yellow arrow points from this bubble to the "T" folder in the left pane.

8 Objects.

20/10/2010

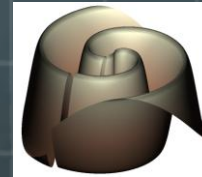
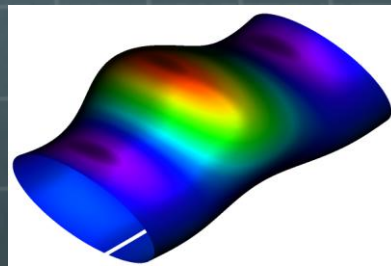
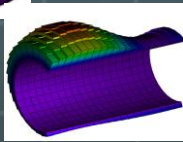
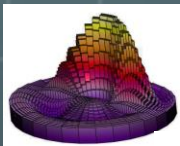
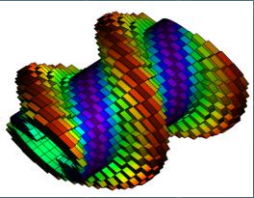
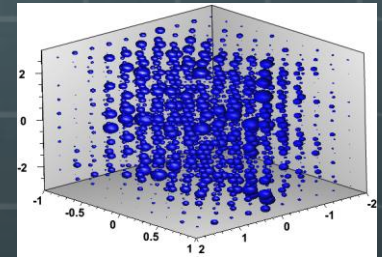


Graphics (2D-3D)

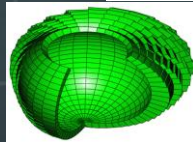
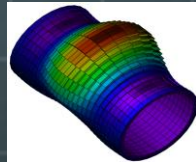
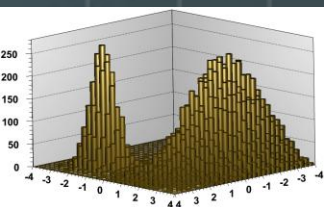


TH3

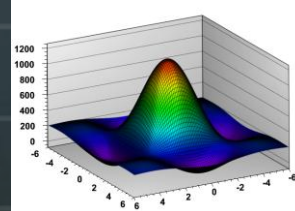
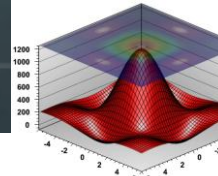
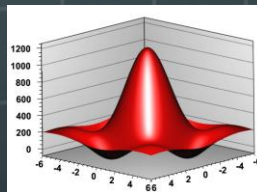
TGLParametric



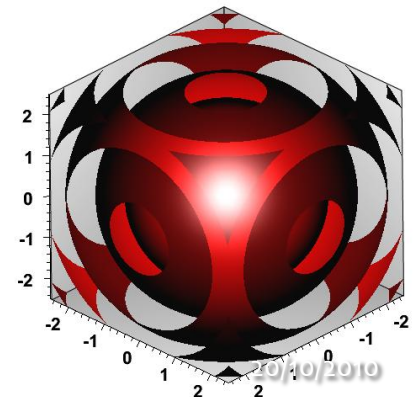
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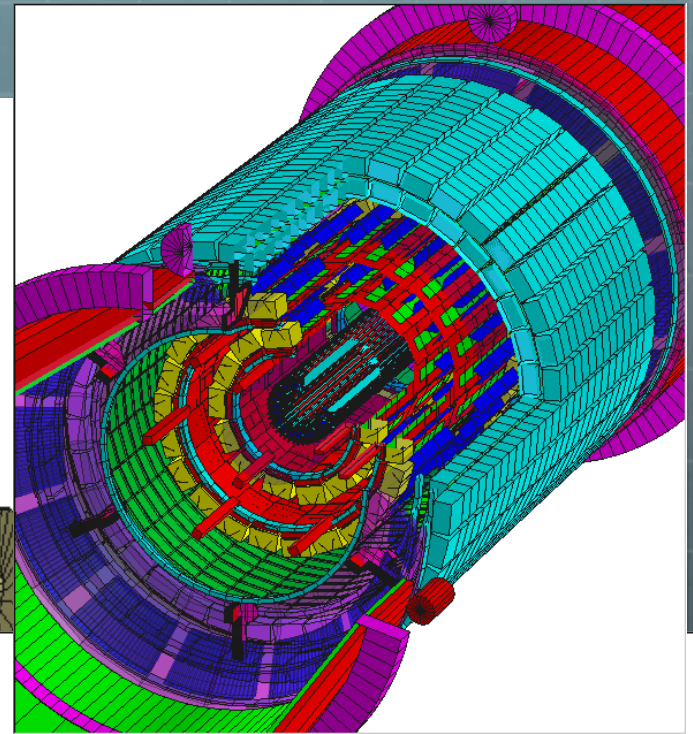
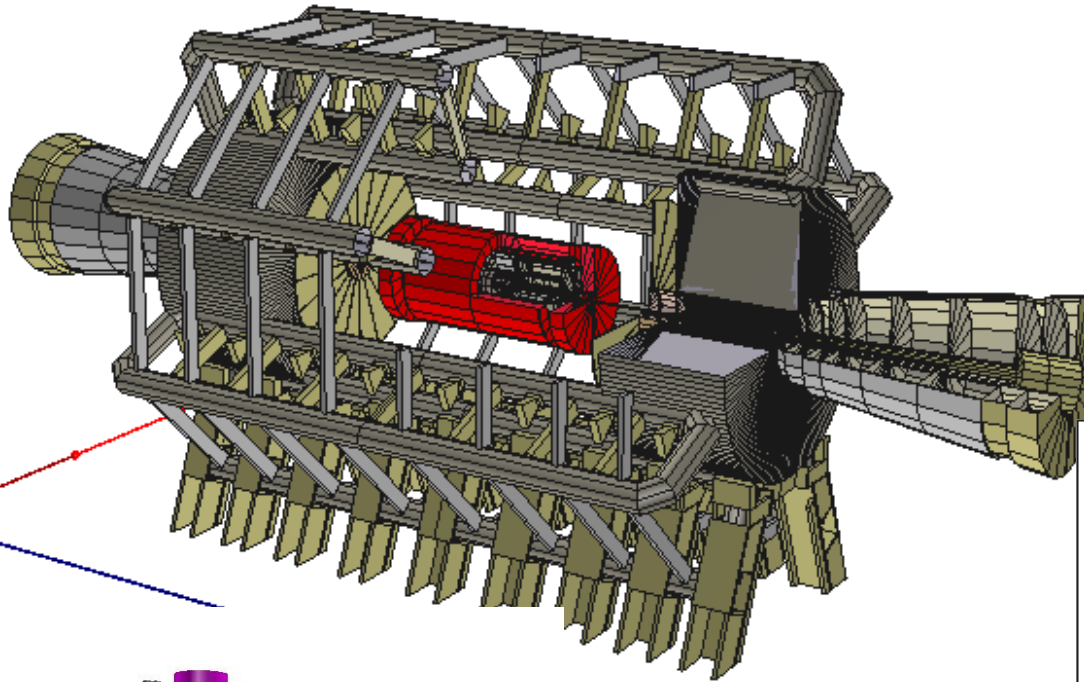
“SURE”



TEC

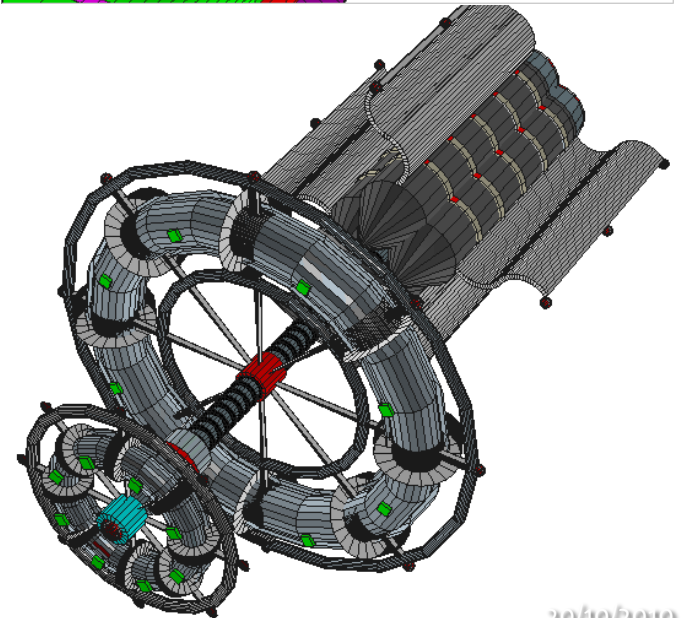


OpenGL

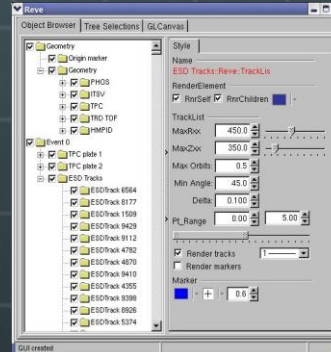
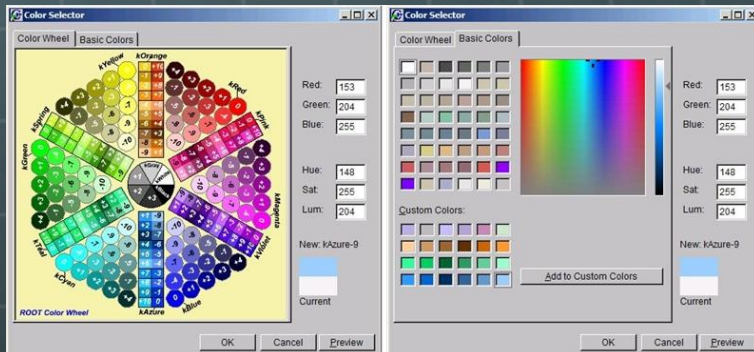
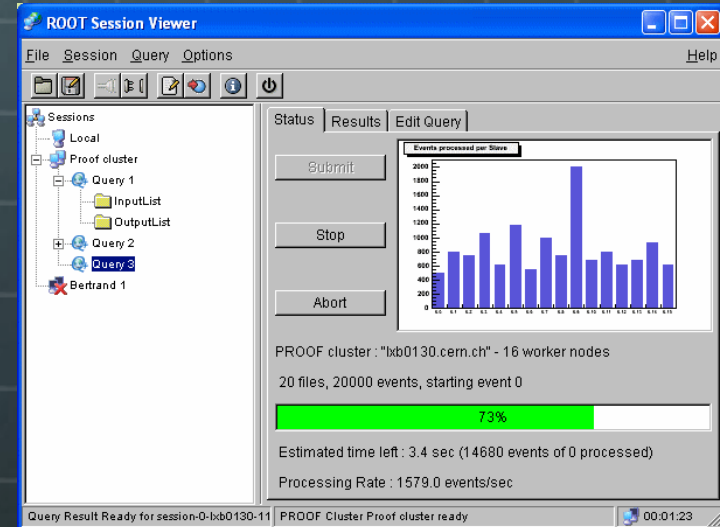
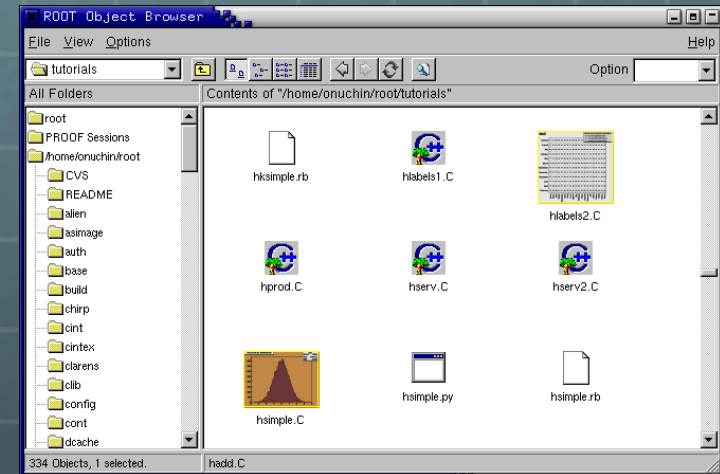
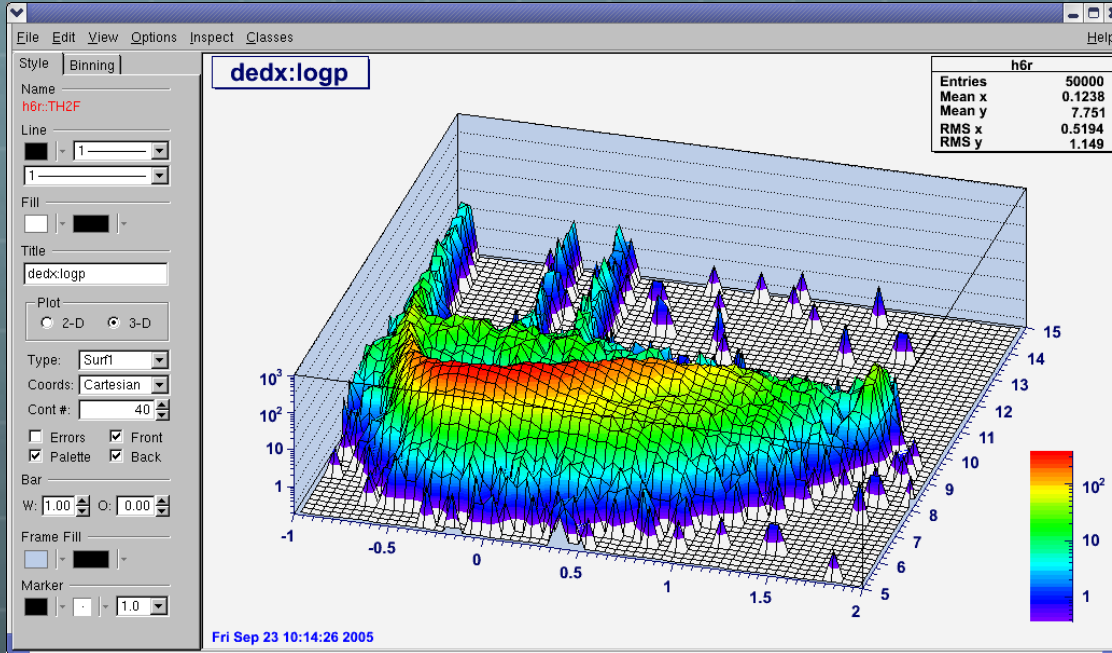


2315 z

see [\\$ROOTSYS/tutorials/geom](http://$ROOTSYS/tutorials/geom)



GUI (Graphical User Interface)



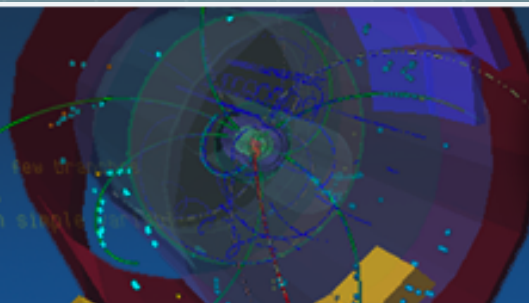


ROOT

```

//create the file, the Tree and a few branches
TFile f("tree1.root","recreate");
TTree t1("t1","a simple Tree with simple branches");
t1.Branch("px",&px,"px/F");
t1.Branch("py",&py,"py/F");

```



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[Moderator Control Panel]

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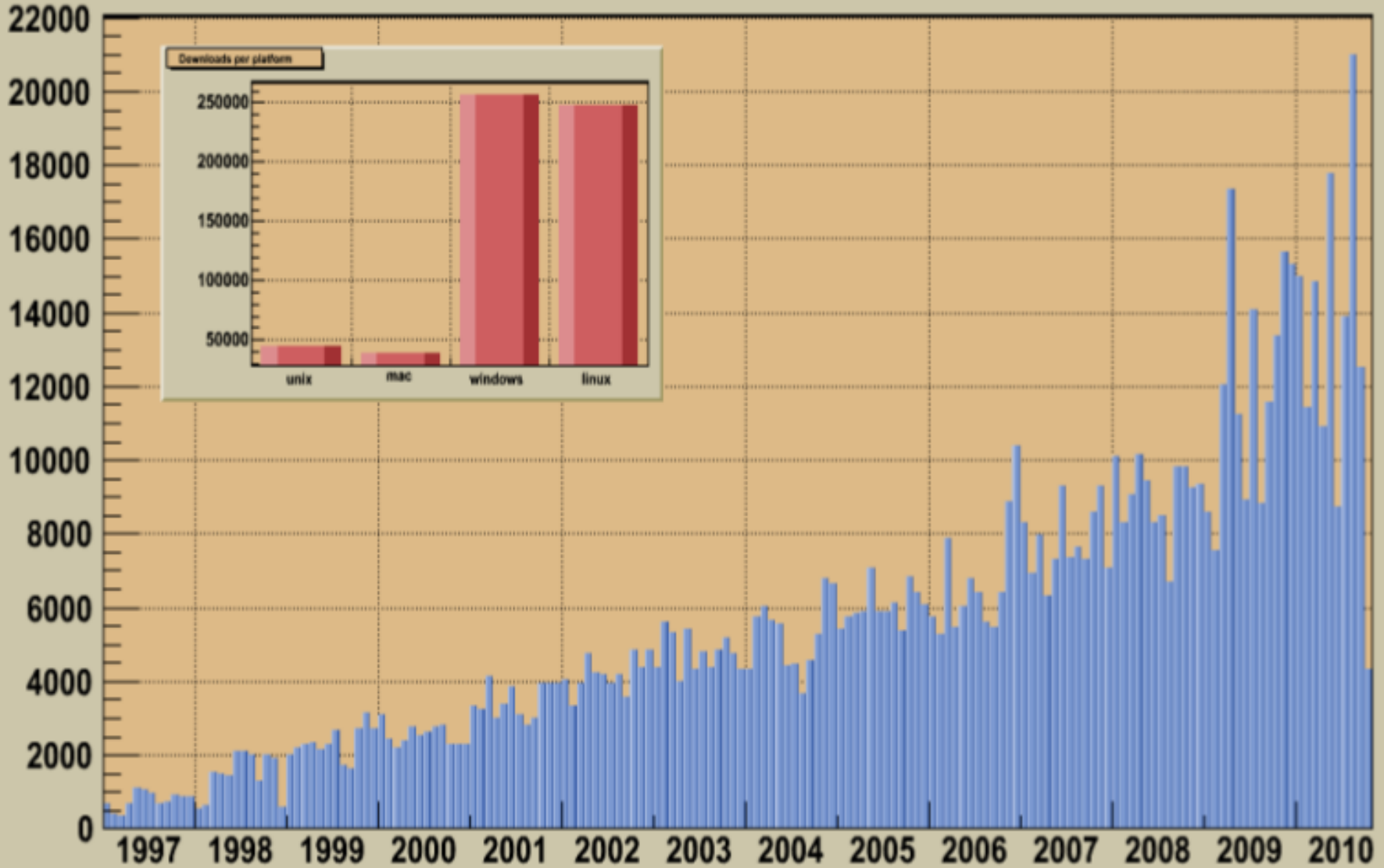
| GENERAL | TOPICS | POSTS | LAST POST |
|---|--------|-------|-------------------------------------|
| Announcements General Announcements. Moderator: rootdev | 69 | 88 | by brun Thu Sep 30, 2010 9:10 |
| ROOT | TOPICS | POSTS | LAST POST |
| ROOT Support Get help with installing and running ROOT here. Please post bug reports here. Moderator: rootdev | 9461 | 41948 | by Jike Mon Oct 11, 2010 8:17 |
| ROOT Documentation Discuss the ROOT documentation here. Moderator: rootdev | 136 | 396 | by brun Thu Sep 30, 2010 18:30 |
| PROOF Discuss PROOF, the Parallel ROOT Facility, here. Moderator: rootdev | 191 | 952 | by hyxu Fri Oct 08, 2010 20:01 |
| Stat and Math Tools Discuss RooFit, TMVA and other statistical and mathematical tools here. Please post bug reports here. Moderators: cranmer, rootdev | 410 | 1420 | by moneta Thu Sep 30, 2010 21:08 |
| PyROOT Discuss PyROOT, the Python interface to ROOT. Moderators: wlav, rootdev | | | |
| My ROOT App Discuss the ROOT system application. Moderator: rootdev | | | Fri Oct 08, 2010 17:16 |

STATISTICS

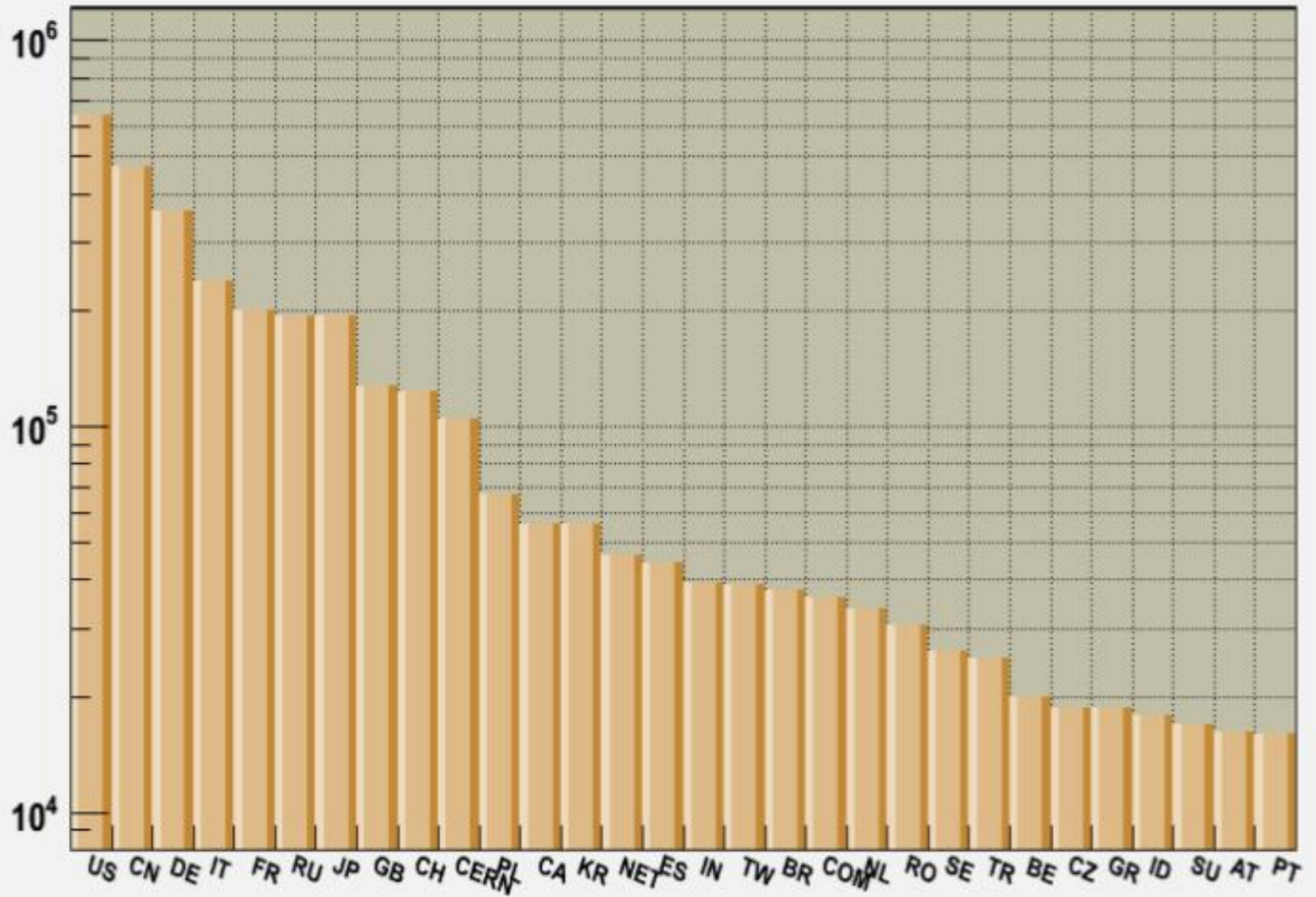
Total posts **48730** • Total topics **11178** • Total members **4856** •

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Summary

- 🌐 ROOT is a mature product, but in constant development. In our field, a stable product is a dead product.
- 🌐 We have between 20000 and 40000 users, ie most of them outside HEP.
- 🌐 The development team is just sufficient to provide a good support to the HEP community.
- 🌐 The ROOT ownership is not only CERN, but also FNAL and 180 developers from everywhere in the world.