JavaScript ROOT

https://root.cern.ch/js/

Bertrand Bellenot (CERN), Sergey Linev (GSI Darmstadt)

Introduction

JavaScript ROOT aims to provide interactive ROOT-like graphics in web browsers. Object data can be read from binary ROOT files (offline) or received from ROOT applications running THttpServer (online). It is successor of JSRootIO project.

Code reorganization

JSRootIO code was fully rewritten to make it modular. I/O part was clearly separated from the graphics. Following modules were introduced:

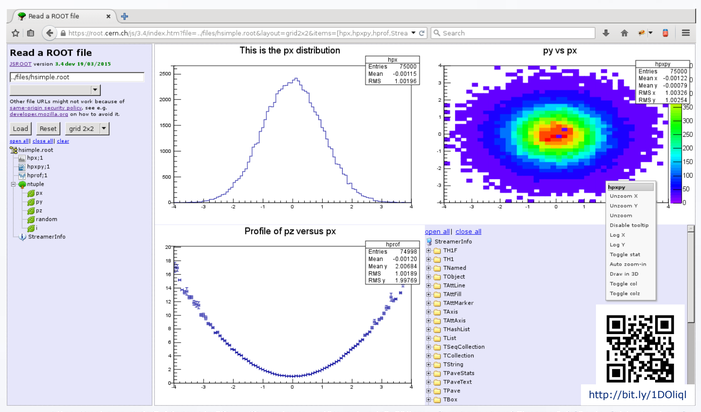
- **io** - reading of binary ROOT files
- **2d** - main 2D graphic, based on d3.js
- **jq2d** - advanced 2D graphic with jQuery.js and jQuery-ui.js
- **3d** - 3D graphic for TH2/TH3 with three.js
- **gui** - generic user interface.

Modules can be specified when loading *JSRootCore.js*

New functionality

- context menus
- zooming with mouse and touch devices
- update information in stat box
- optimized drawing for large 1D histograms
- html5 canvas to speed-up large 2D drawings
- move/resize of elements like title or stat box
- MathJax.js for latex output
- possibility to open several files
- drag and drop to superimpose objects

User interface



https://root.cern.ch/js/3.4/index.htm?file=../files/hsimple.root&layout=grid2x2&items=[hpx,hpxpy,hprof,StreamerInfo]&opts=[hist,colz,e1,any]

How to use JSROOT

Include *JSRootCore.js* script into HTML page and specify modules to be loaded:

```
<script type="text/javascript"
src="https://root.cern.ch/js/3.4/scripts/JSRootCore.min.js?2d"></script>
```

Request data from JSON file or *THttpServer*:

```
var addr = "https://root.cern.ch/js/3.4/demo/hpx.json";
var req = JSROOT.NewHttpRequest(addr, 'object', function(obj) {
    JSROOT.draw("drawing", obj, "hist");
});
req.send(null);
```

http://bit.ly/1EXJl44

JSROOT.TFile class

Used to read objects data from binary ROOT files. Mostly repeats logic of binary ROOT I/O, introducing *JSROOT.TBuffer* class and using streamer infos for reading. All custom streamers handled in central place, user classes can be supported.

```
var filename = "https://root.cern.ch/js/files/hsimple.root";
new JSROOT.TFile(filename, function(file) {
   file.ReadObject("hpxpy;1", function(obj) {
      JSROOT.draw("drawing", obj, "colz");
   });
});
```

http://bit.ly/1CRt4yk

URL parameters

Used to configure view on the central JSROOT web-page like:

```
https://root.cern.ch/js/3.4/?file=../files/hsimple.root&item=hpx;1
```

Major parameters are:

- file(s) – name of file(s) to open
- item(s) – item name(s) to display
- opt(s) – draw option for the item(s)
- layout – layout for drawings like grid or tabs
- nobrowser – do not display objects hierarchy
- mathjax – enable usage of MathJax.js
- interactive – enable/disable interactive features

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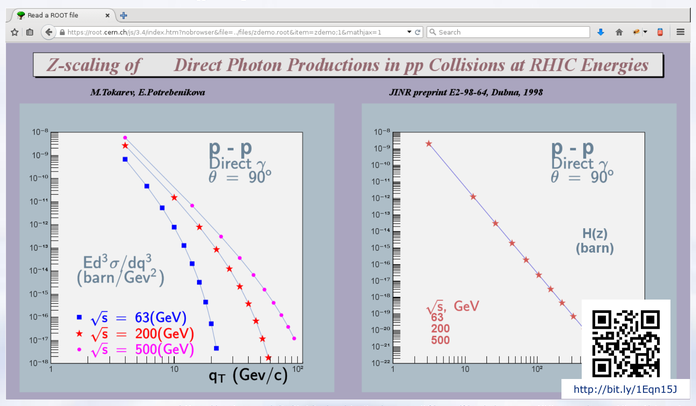
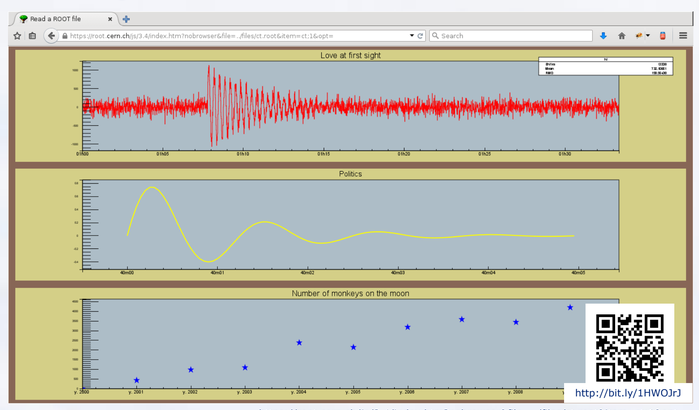
Canvas with graphs and labels



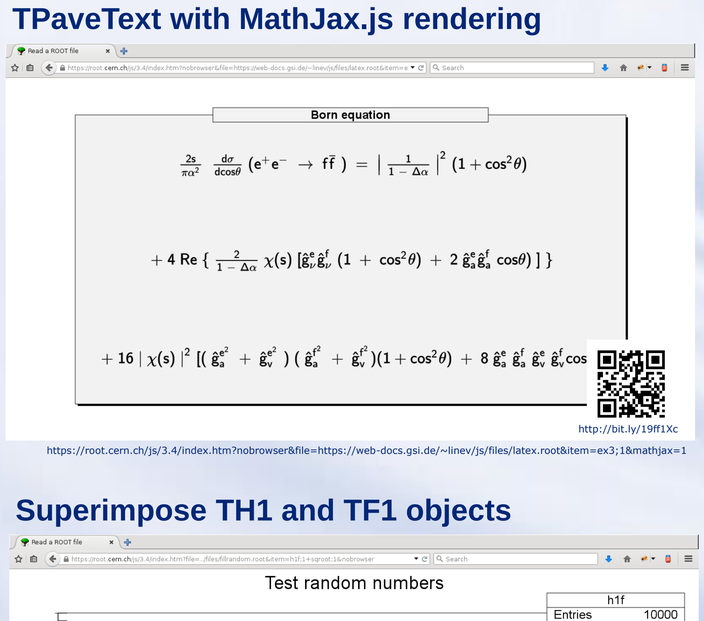
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/zdemo.root&item=zdemo;1&mathjax=1

Drawings on time axis



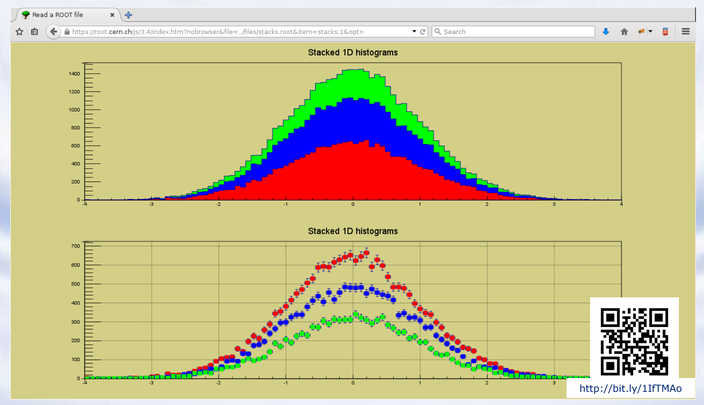
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/ct.root&item=ct;1&opt=

TPaveText with MathJax.js rendering



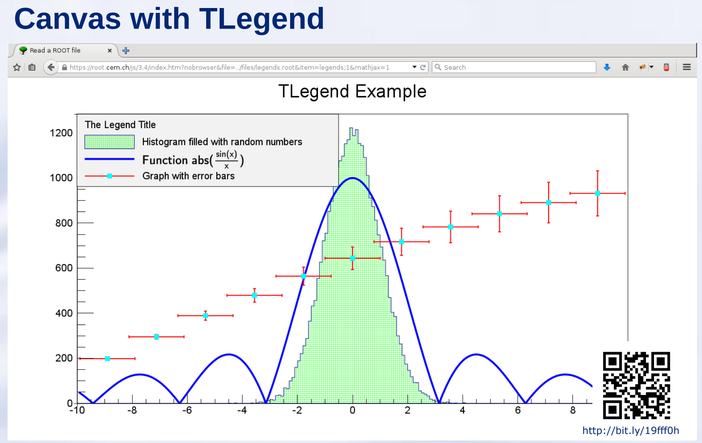
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=https://web-docs.gsi.de/~linev/js/files/latex.root&item=ex3;1&mathjax=1

Stacked histograms



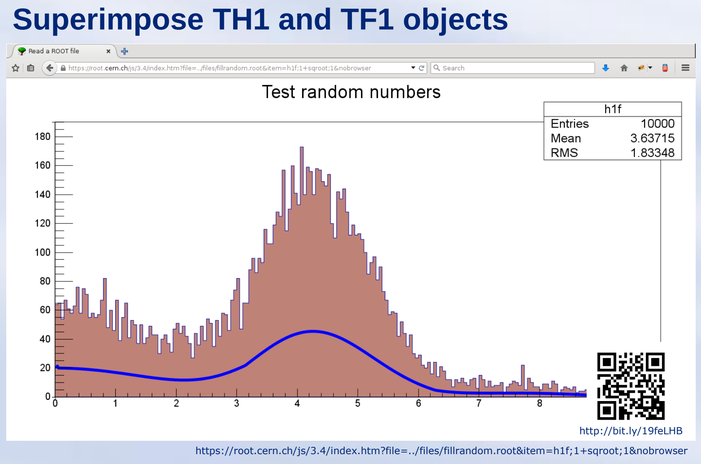
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/stacks.root&item=stacks;1&opt=

Canvas with TLegend



https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/legends.root&item=legends;1&mathjax=1

Superimpose TH1 and TF1 objects

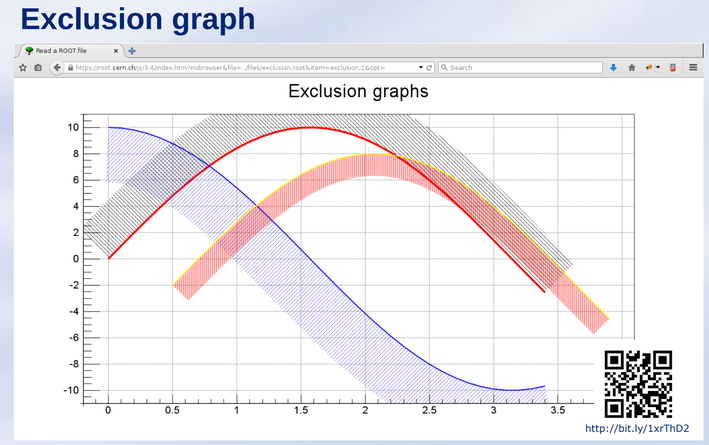


https://root.cern.ch/js/3.4/index.htm?file=../files/fillrandom.root&item=h1f;1+sqroot;1&nobrowser

TH3 drawings with three.js

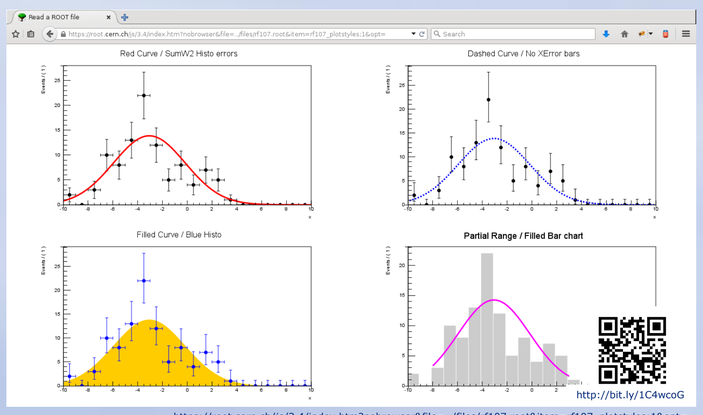
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/glbox.root&item=h31;1&opt=

Exclusion graph



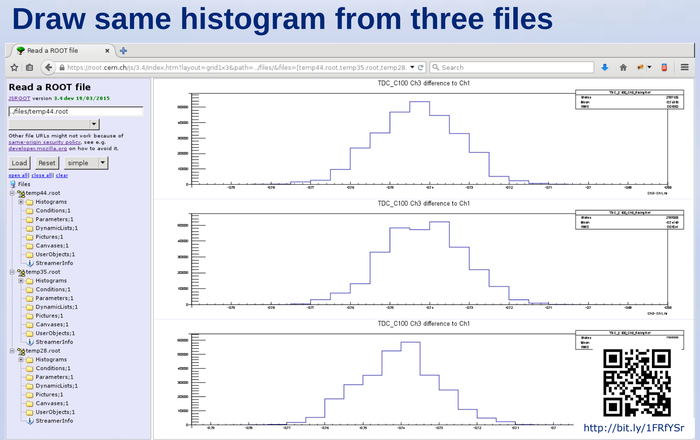
https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/exclusion.root&item=exclusion;1&opt=

RooFit canvas

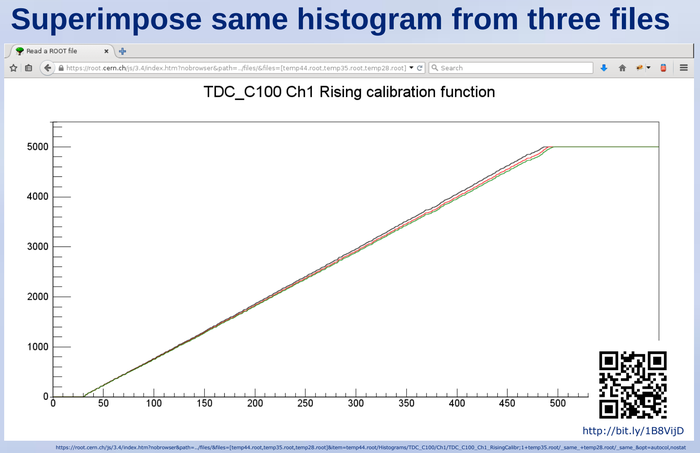


https://root.cern.ch/js/3.4/index.htm?nobrowser&file=../files/rf107.root&item=rf107_plotstyles;1&opt=

Draw same histogram from three files



Superimpose same histogram from three files



CHEP 2015, 13-17 April 2015, Okinawa, Japan, http://chep2015.kek.jp/