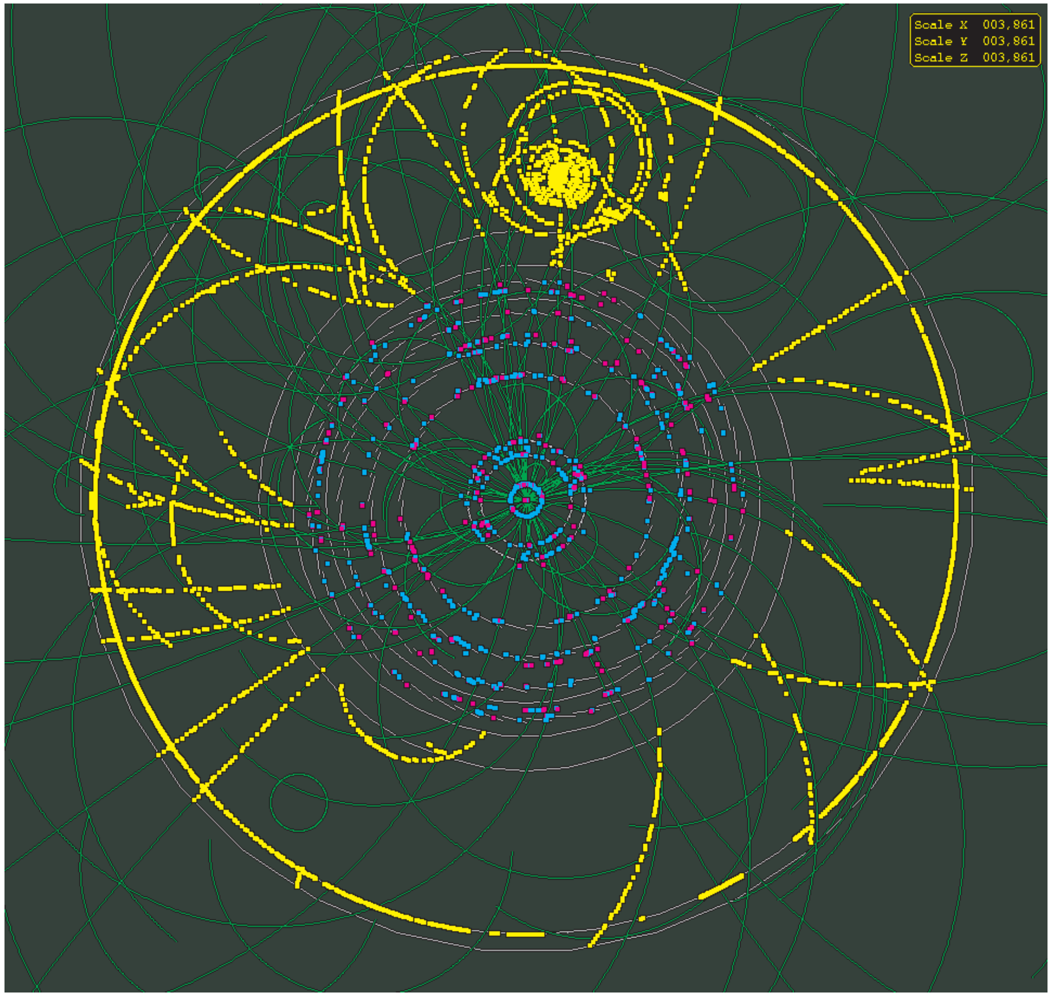
WIRED (& Atlas)

3rd LHC CWS, Marseille, Sep'99

J.Hrivnac


Scale X 003,861
Scale Y 003,861
Scale Z 003,861

- WIRED
- WIRED in Atlas
- Atlas in WIRED

http://wired.cern.ch
http://atlasinfo.cern.ch/Atlas/Welcome.html
http://www.cern.ch/Atlas/GROUPS/SOFTWARE/OO/

WIRED

World-Wide Web Interactive Remote Event Display

Application and Component Framework for Event Displays in Java

- started in 1996 by Mark Donszelmann
- community has found it useful
- now used & co-developped by Atlas, LHC-b, Chorus, Delphi, BaBar, D0, Zeus, ...

WIRED

Features

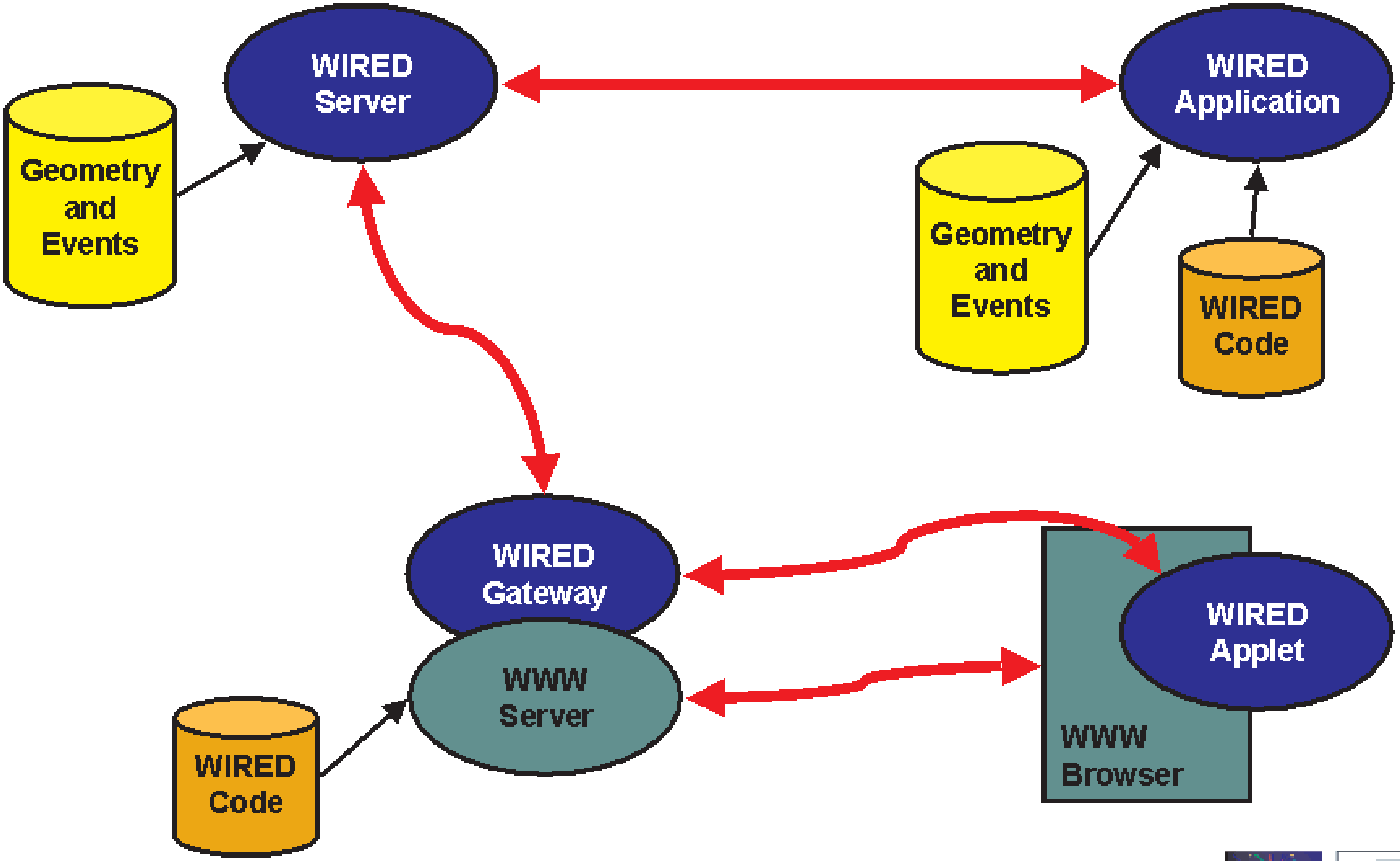
- Framework for Event Display
  - 10% of the code is an experiment specific plug-in
- Application or Applet
  - can run inside WWW browser or as an application
- 100% Java
  - connects to C, C++, Fxx for data
- Graphics Engine for HEP specific projections
  - 3D Parallel, 2D Flat, 2D Scalable, rho-z, rho-phi, phi-z, Circular Fish-Eye, Rectangular Fish-Eye
  - cascading
  - configurable
- Client-Server architecture
  - Corba, RMI, XML
- Bean Shell
  - Java scripting

WIRED

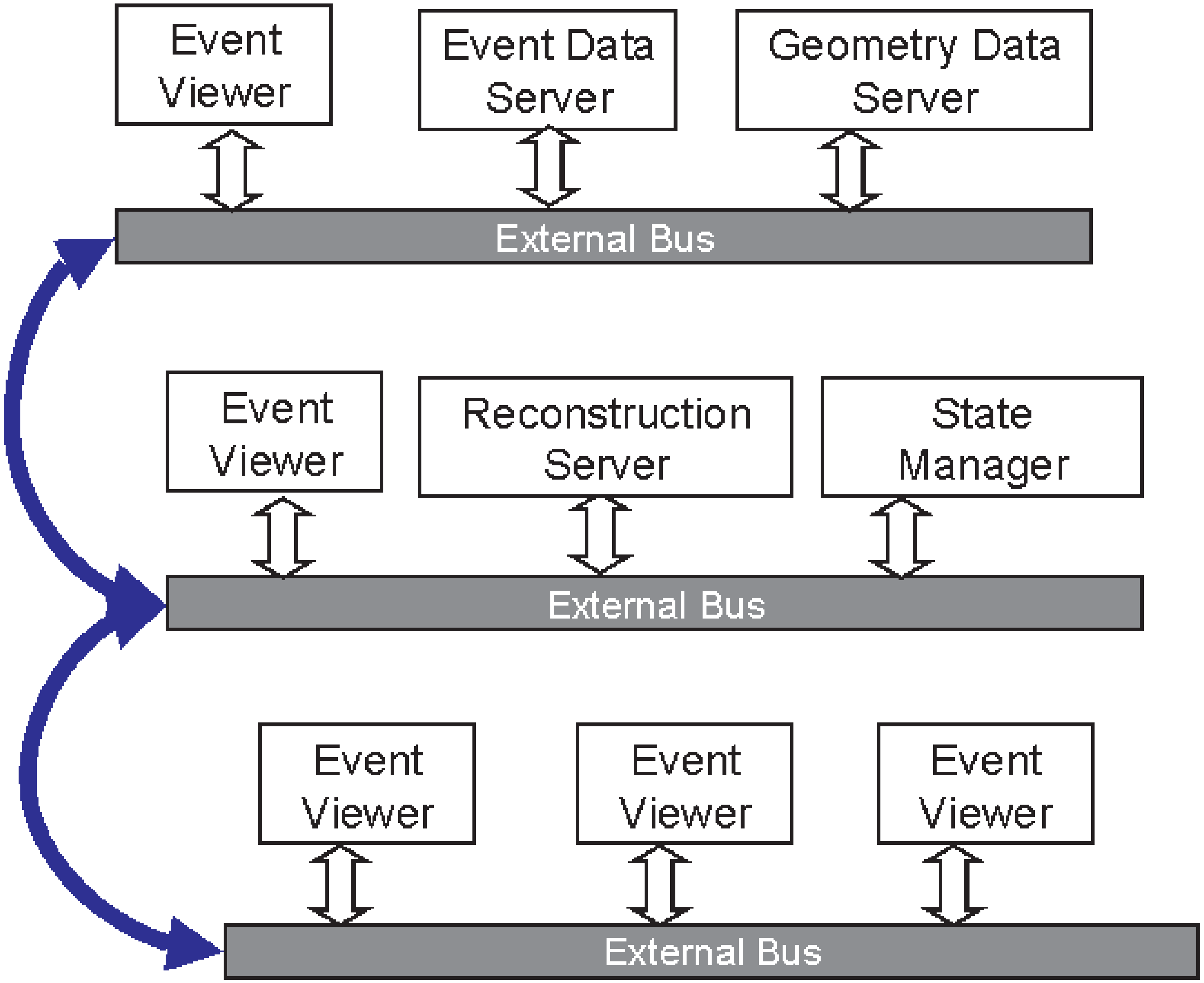
Plans

- Integration with JAS
- Interactive changes to representations
- More projections
- Info bus

Client-Server/File Architecture

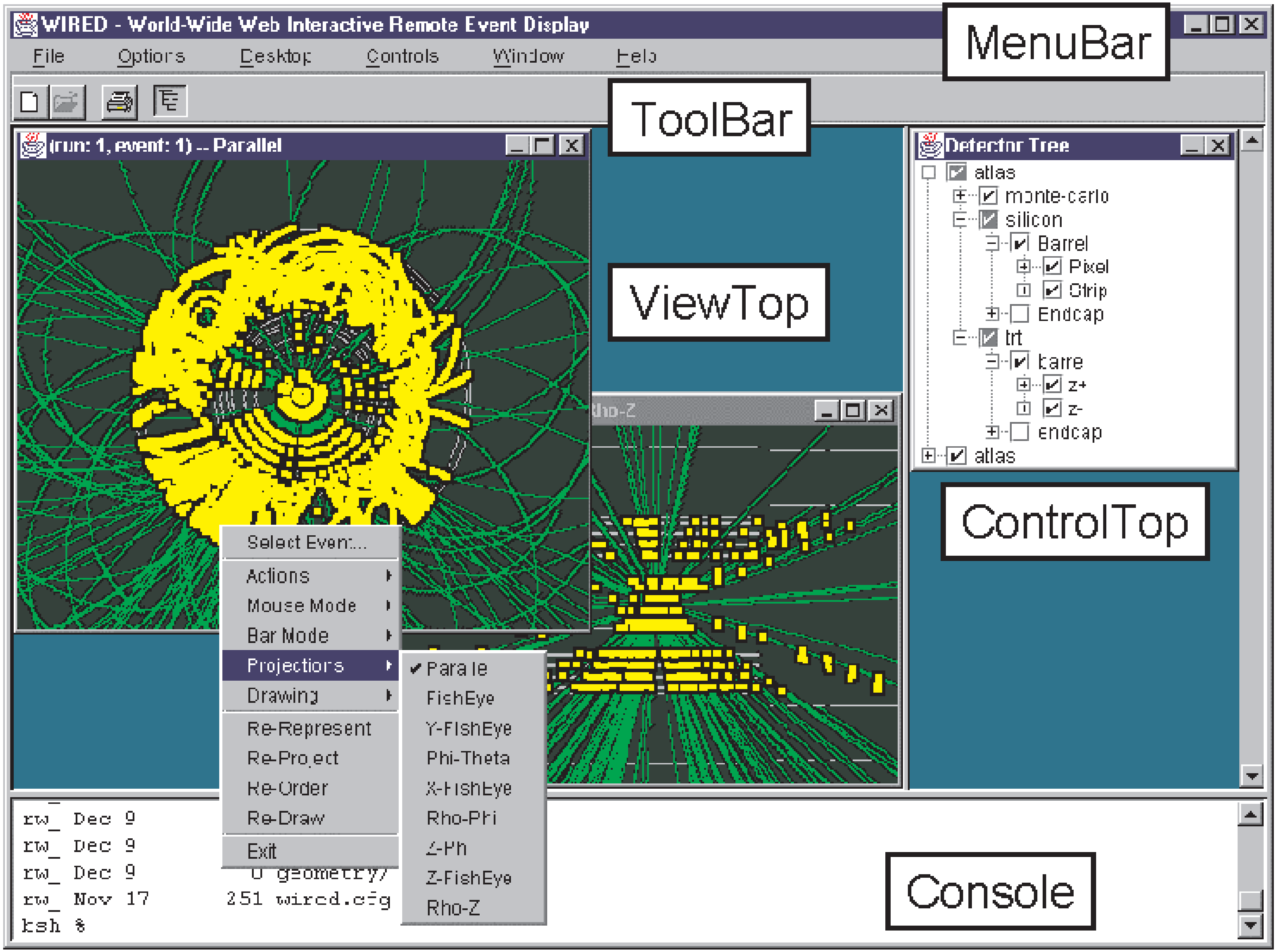

WIRED Server
WIRED Application
Geometry and Events
Geometry and Events
WIRED Code
WIRED Gateway
WWW Server
WIRED Applet
WWW Browser
WIRED Code

WIRED connected to services via bus


Event Viewer
Event Data Server
Geometry Data Server
External Bus
Event Viewer
Reconstruction Server
State Manager
External Bus
Event Viewer
Event Viewer
Event Viewer
External Bus

- to access Data
- to access other Services
- to enable Collaboration

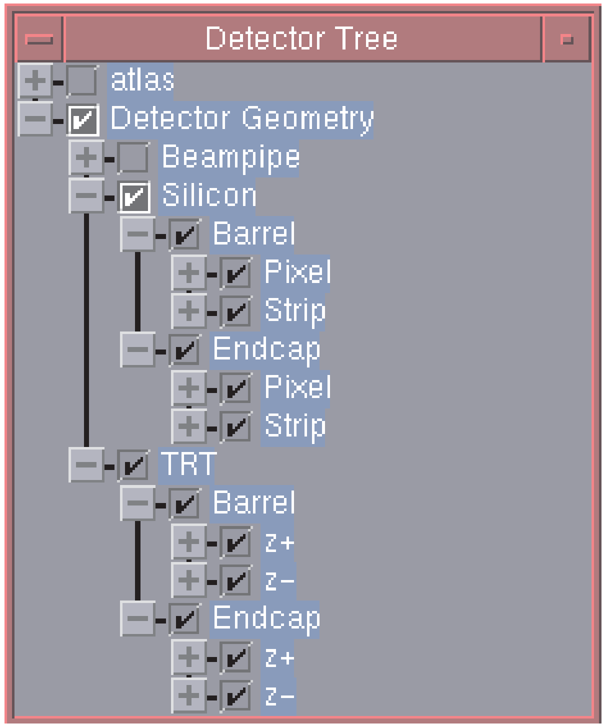
GUI


WIRED - World-Wide Web Interactive Remote Event Display
File
Options
Desktop
Controls
Window
Help
MenuBar
ToolBar
(run: 1, event: 1) -- Parallel
ViewTop
Rho-Z
Detector Tree
atlas
monte-carlo
silicon
Barrel
Pixel
Strip
Endcap
trt
barre
z+
z-
endcap
atlas
ControlTop
Select Event...
Actions
Mouse Mode
Bar Mode
Projections
Drawing
Re-Represent
Re-Project
Re-Order
Re-Draw
Exit
✔ Parallel
FishEye
Y-FishEye
Phi-Theta
X-FishEye
Rho-Phi
Z-Phi
Z-FishEye
Rho-Z
Console

```
rw_  Dec  9
rw_  Dec  9
rw_  Dec  9        0 geometry/
rw_  Nov  17     251 wired.cfg
ksh %
```

Tree Navigator

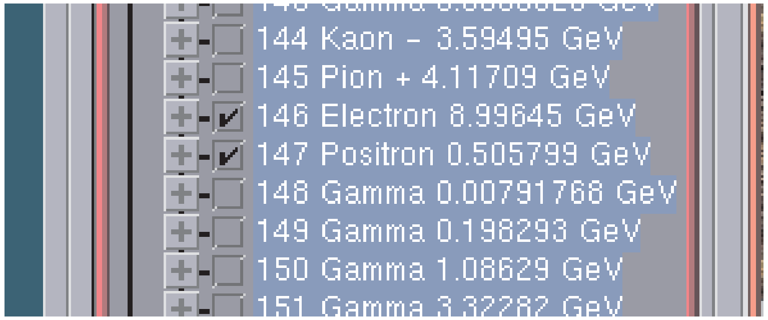
(D.Koper from Atlas)



Detector Tree

- ☐ atlas
- ☑ Detector Geometry
  - ☐ Beampipe
  - ☑ Silicon
    - ☑ Barrel
      - ☑ Pixel
      - ☑ Strip
    - ☑ Endcap
      - ☑ Pixel
      - ☑ Strip
  - ☑ TRT
    - ☑ Barrel
      - ☑ z+
      - ☑ z−
    - ☑ Endcap
      - ☑ z+
      - ☑ z−

Detector

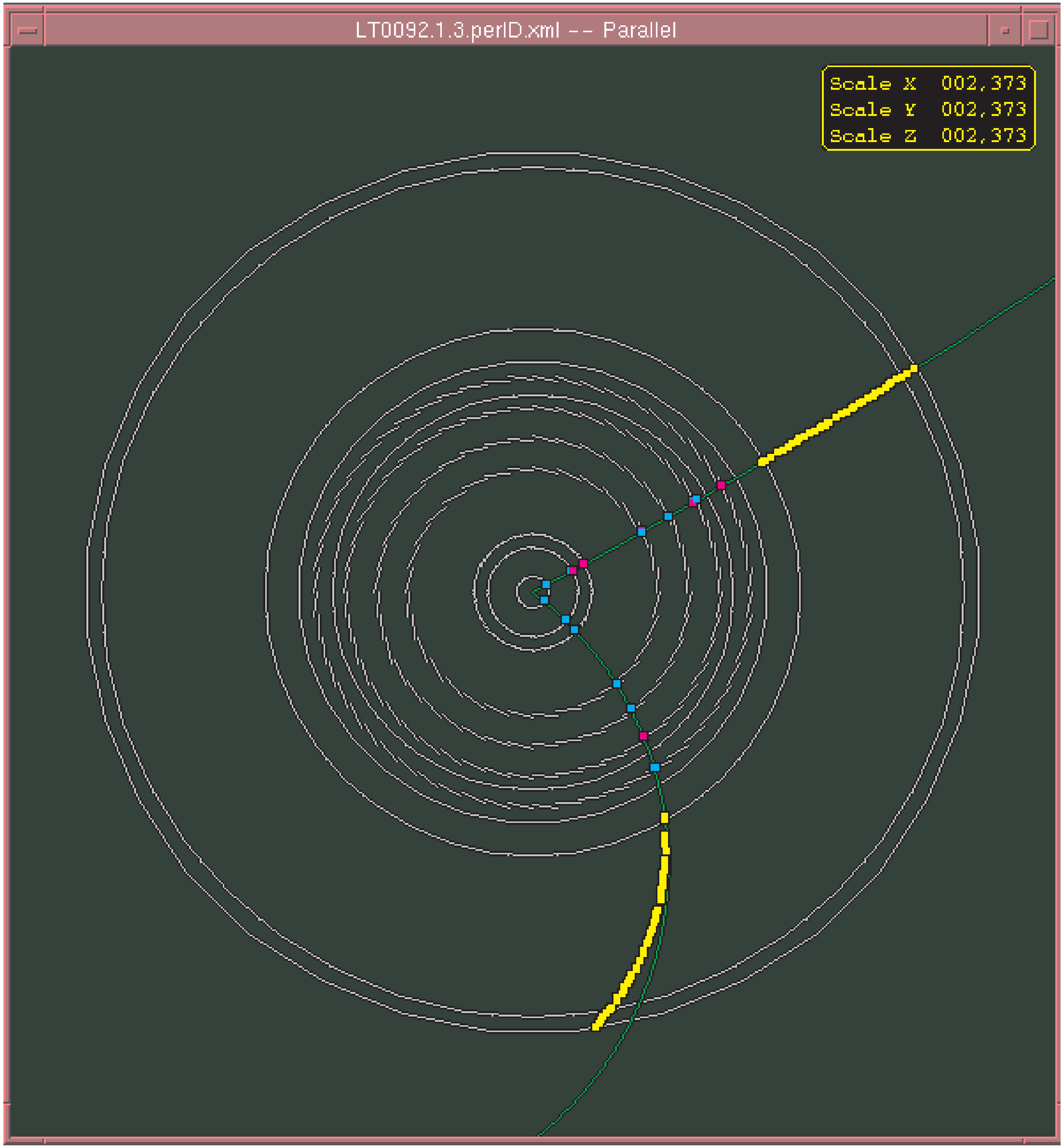


- ☐ 144 Kaon − 3.59495 GeV
- ☐ 145 Pion + 4.11709 GeV
- ☑ 146 Electron 8.99645 GeV
- ☑ 147 Positron 0.505799 GeV
- ☐ 148 Gamma 0.00791768 GeV
- ☐ 149 Gamma 0.198293 GeV
- ☐ 150 Gamma 1.08629 GeV
- ☐ 151 Gamma 3.32282 GeV

Event

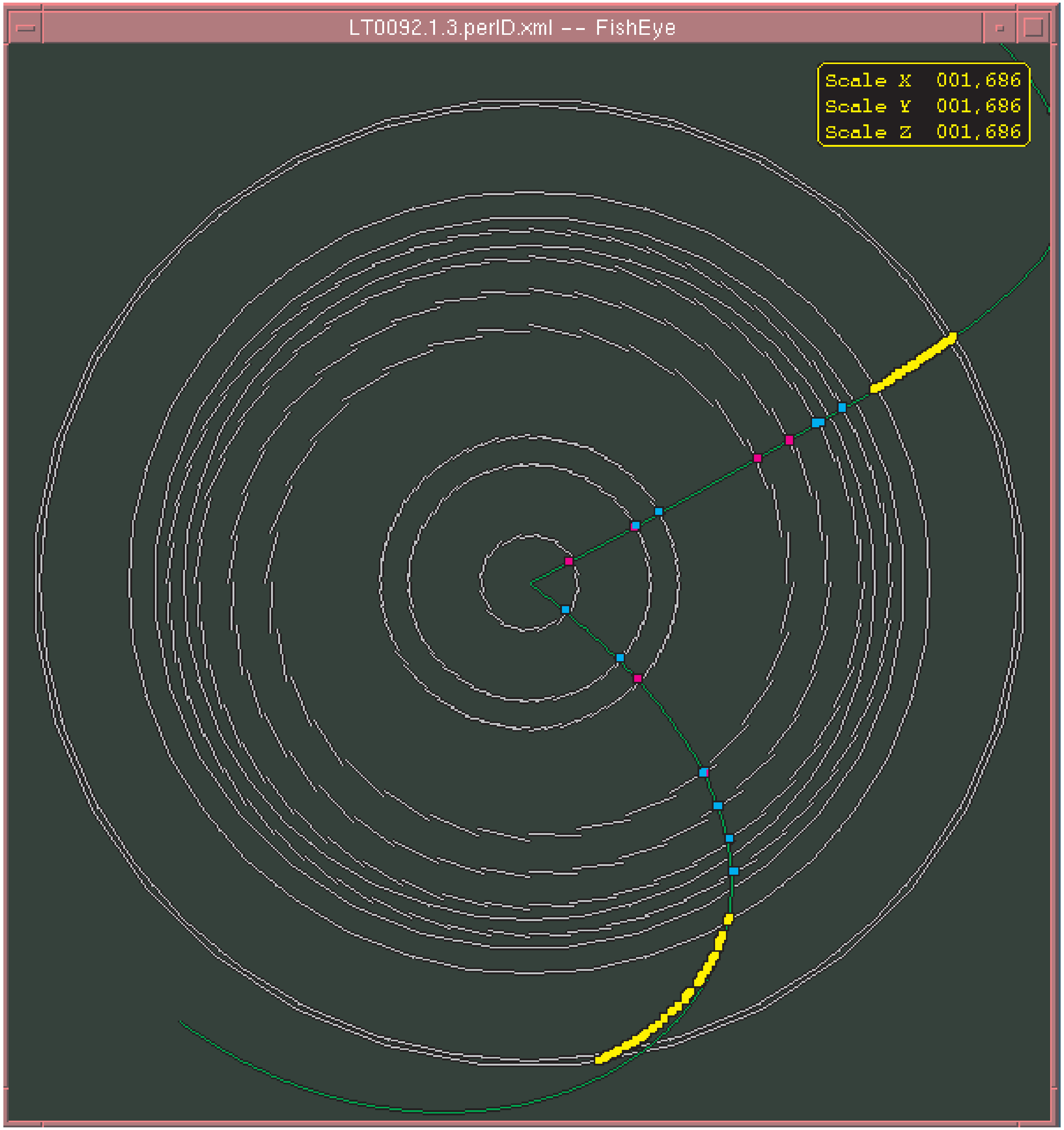
Two Tracks

Parallel projection


LT0092.1.3.perlD.xml -- Parallel
Scale X 002,373
Scale Y 002,373
Scale Z 002,373

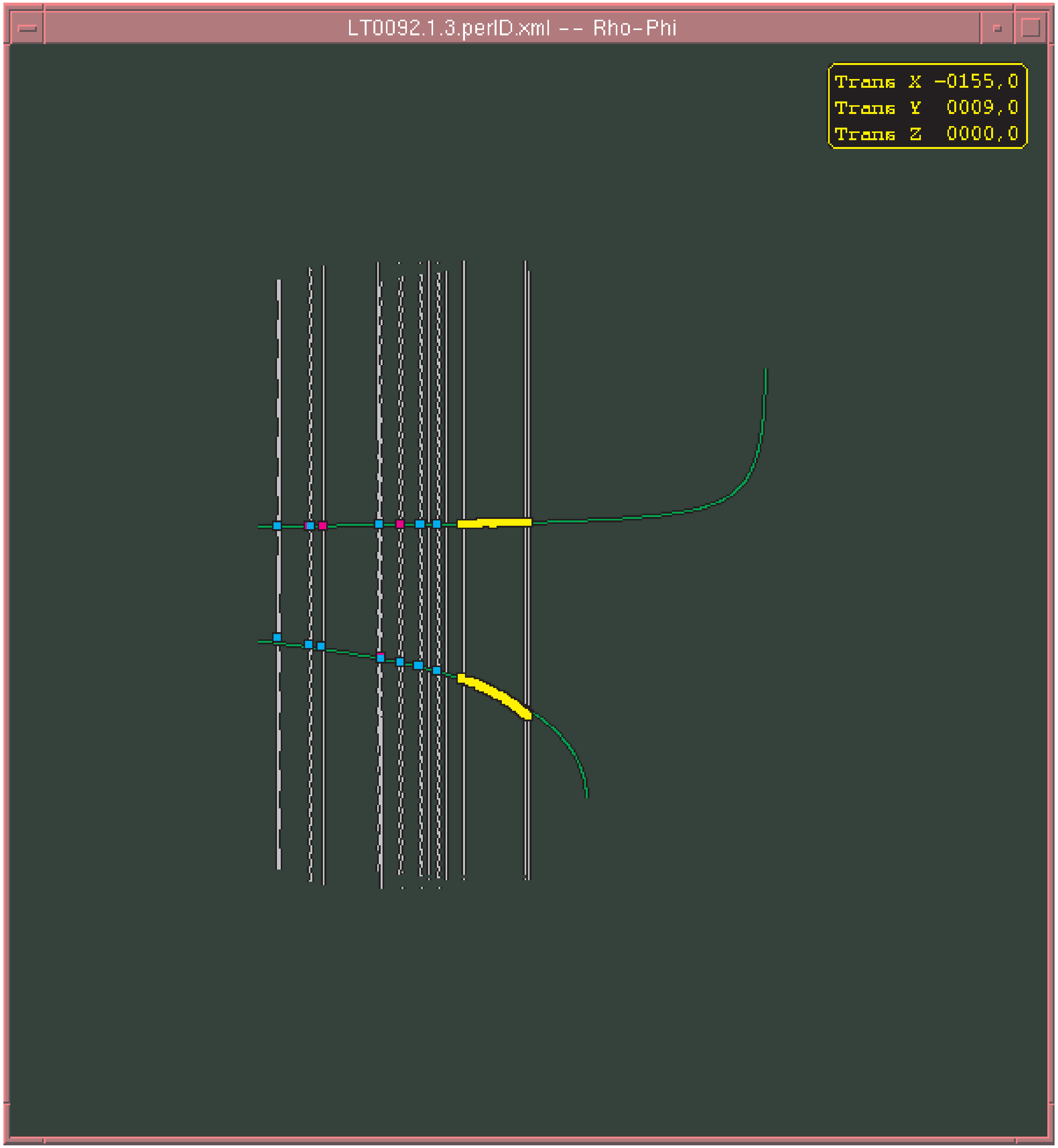
Two Tracks

Fish-eye projection


LT0092.1.3.perlD.xml -- FishEye
Scale X 001,686
Scale Y 001,686
Scale Z 001,686

Two Tracks

ρ–φ projection


LT0092.1.3.perlD.xml -- Rho-Phi

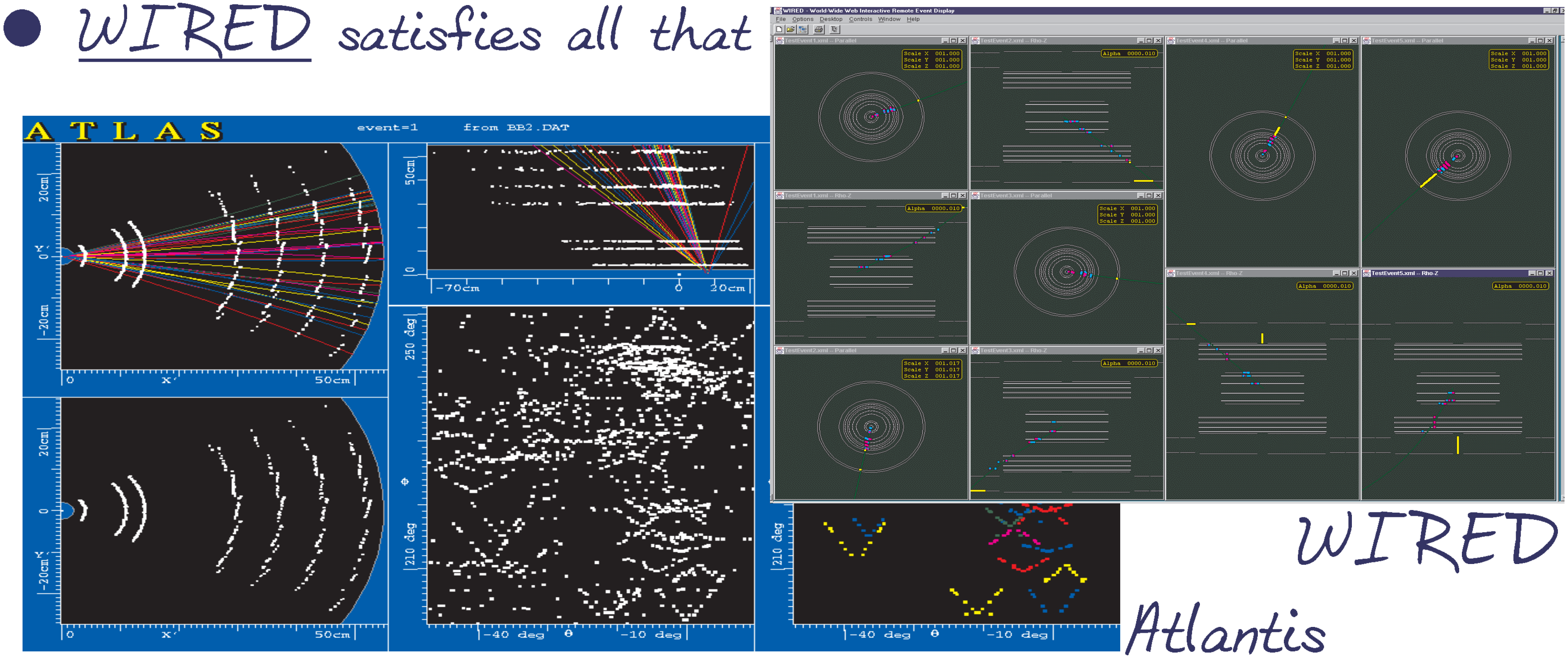
Trans X -0155,0
Trans Y 0009,0
Trans Z 0000,0

WIRED in Atlas

- Standard Requirements:
  - modularity, maintainability, ...
- true, but also (more difficult part):
  - I want to see why my Event looks so strange.
  - I want to see if my Pattern Recognition works well.
  - I want to see what's going on in that part of the detector.
  - ...
- we know that there are tools satisfying some of those requirements
  - but no tool (can) satisfy all (current and future) requirements
  - some requirements are even not satisfied by any tool (so we should do something ourselves) - mainly true for Event Display, where experiments have specific needs
- so we should be able to choose, select, enhance, limit, integrate various tools in our framework
  - we should choose tools supporting that

WIRED in Atlas

- specifically in an Event Display, we want:
  - functionality of some existing (traditional) tools (Atlantis,...)
  - compatibility with our Framework
  - compatibility with other Tools which we are using
  - sharing with others what can be shared
  - easy participation in the development
- WIRED satisfies all that


A T L A S
event=1
from BB2.DAT
20cm
0
-20cm
X'
50cm
-70cm
20cm
250 deg
210 deg
Φ
-40 deg
θ
-10 deg
WIRED - World-Wide Web Interactive Remote Event Display
File
Options
Desktop
Controls
Window
Help

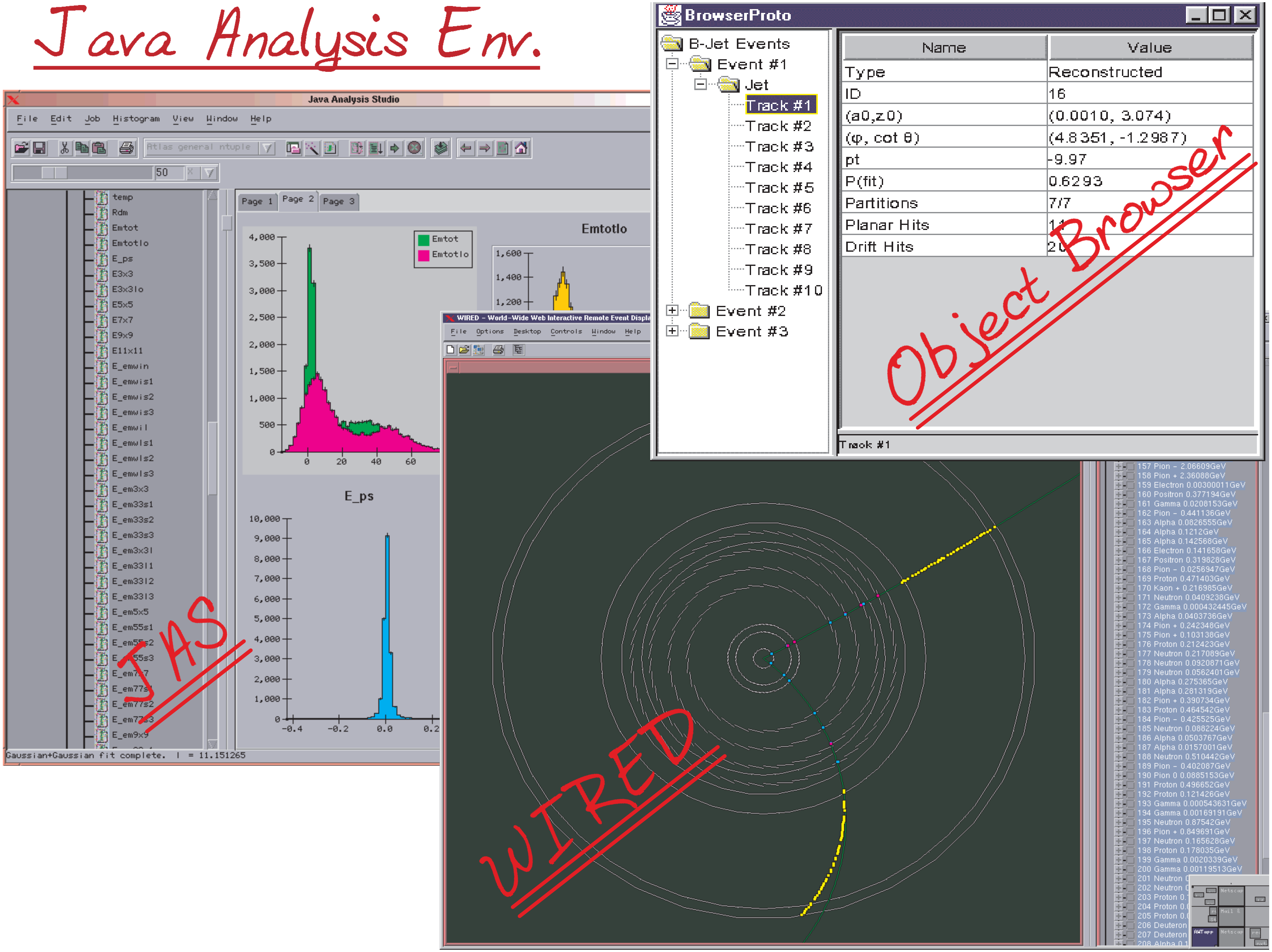
WIRED

Atlantis

Atlas in WIRED

- specifying concrete requirements:
  - projections (mostly from Atlantis)
  - Event model (XML DTD)
- code development:
  - Tree Navigator
- stress test:
  - performance constrains design (object granularity)

Java Analysis Env.



Java Analysis Studio
File Edit Job Histogram View Window Help
Atlas general ntuple
50
temp
Rdm
Emtot
Emtotlo
E_ps
E3x3
E3x3lo
E5x5
E7x7
E9x9
E11x11
E_emwin
E_emwis1
E_emwis2
E_emwis3
E_emwil
E_emwls1
E_emwls2
E_emwls3
E_em3x3
E_em33s1
E_em33s2
E_em33s3
E_em3x3l
E_em33l1
E_em33l2
E_em33l3
E_em5x5
E_em55s1
E_em55s2
E_em55s3
E_em7x7
E_em77s1
E_em77s2
E_em77s3
E_em9x9
Page 1
Page 2
Page 3
Emtot
Emtotlo
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
0
20
40
60
Emtotlo
1,600
1,400
1,200
E_ps
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
-0.4
-0.2
0.0
0.2
WIRED - World-Wide Web Interactive Remote Event Display
File Options Desktop Controls Window Help
BrowserProto
Netscape
Mail &
AWTapp
JAS
WIRED
Object Browser

Gaussian+Gaussian fit complete. | = 11.151265

- B-Jet Events
  - Event #1
    - Jet
      - Track #1
      - Track #2
      - Track #3
      - Track #4
      - Track #5
      - Track #6
      - Track #7
      - Track #8
      - Track #9
      - Track #10
  - Event #2
  - Event #3

Name	Value
Type	Reconstructed
ID	16
(a0,z0)	(0.0010, 3.074)
(φ, cot θ)	(4.8351, -1.2987)
pt	-9.97
P(fit)	0.6293
Partitions	7/7
Planar Hits	11
Drift Hits	20

Track #1

```
157 Pion - 2.06609GeV
158 Pion + 2.36088GeV
159 Electron 0.00300011GeV
160 Positron 0.377194GeV
161 Gamma 0.0208153GeV
162 Pion - 0.441136GeV
163 Alpha 0.0826555GeV
164 Alpha 0.1212GeV
165 Alpha 0.142568GeV
166 Electron 0.141658GeV
167 Positron 0.319828GeV
168 Pion - 0.0256947GeV
169 Proton 0.471403GeV
170 Kaon + 0.216985GeV
171 Neutron 0.0409238GeV
172 Gamma 0.000432445GeV
173 Alpha 0.0403736GeV
174 Pion + 0.242348GeV
175 Pion + 0.103138GeV
176 Proton 0.212423GeV
177 Neutron 0.217089GeV
178 Neutron 0.0920871GeV
179 Neutron 0.0562401GeV
180 Alpha 0.275365GeV
181 Alpha 0.281319GeV
182 Pion + 0.390734GeV
183 Proton 0.464542GeV
184 Pion - 0.425525GeV
185 Neutron 0.088224GeV
186 Alpha 0.0503767GeV
187 Alpha 0.0157001GeV
188 Neutron 0.510442GeV
189 Pion - 0.402087GeV
190 Pion 0 0.0885153GeV
191 Proton 0.496652GeV
192 Proton 0.121426GeV
193 Gamma 0.000543631GeV
194 Gamma 0.00169191GeV
195 Neutron 0.87542GeV
196 Pion + 0.849691GeV
197 Neutron 0.165628GeV
198 Proton 0.178035GeV
199 Gamma 0.0020339GeV
200 Gamma 0.00119513GeV
201 Neutron 0
202 Neutron 0
203 Proton 0.1
204 Proton 0.0
205 Proton 0.0
206 Deuteron
207 Deuteron
208 Alpha 0.1
```