




AGATA Data Analysis Status Report

*O. Stézowski, AGATA week, 11-13 June 2012
on behalf on the team*



Outlines

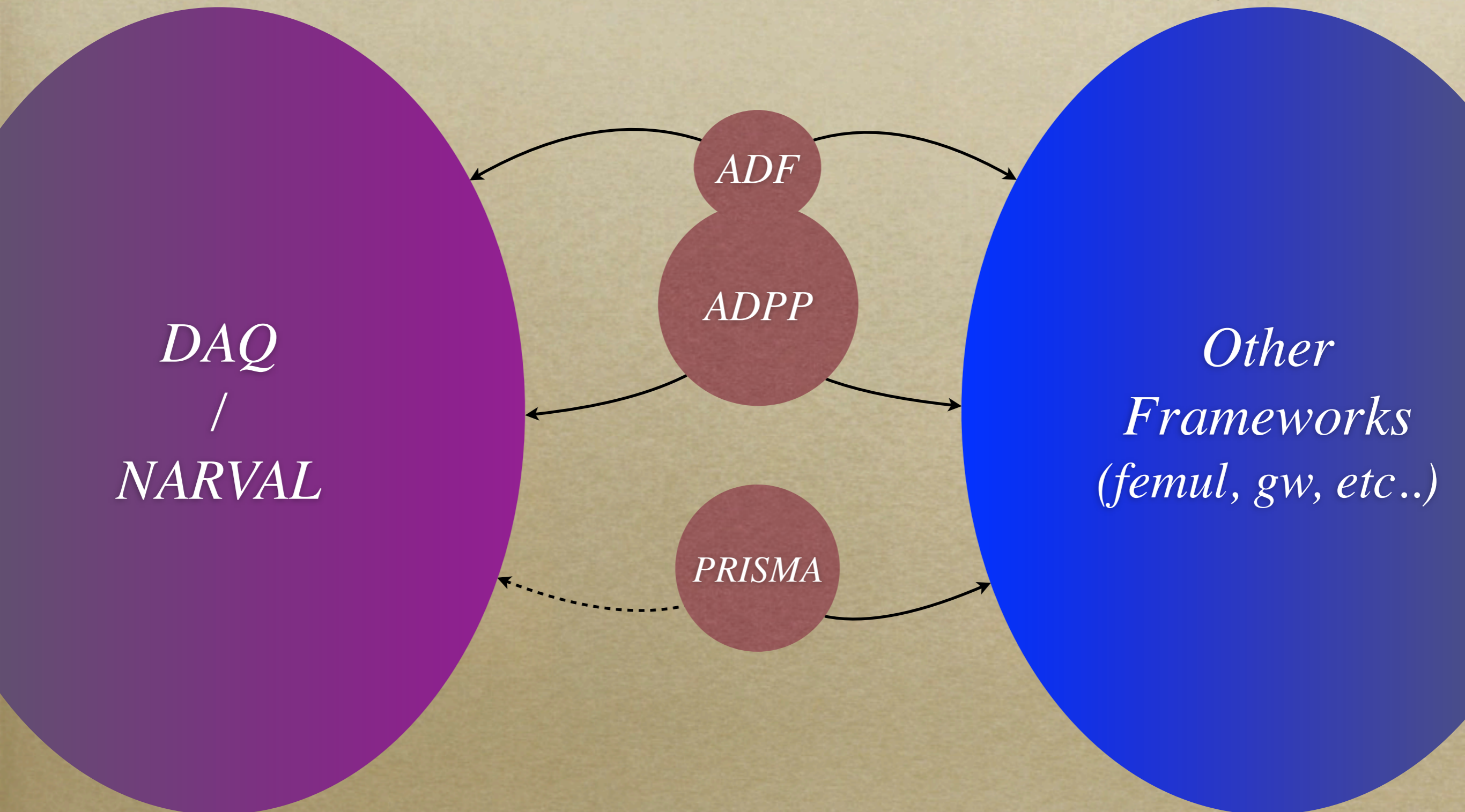
- *From Legnaro to GSI :*
 - ↳ *many worlds / possibilities*
- *Some recent works*
- *GammaWare last developments*
- *Conclusions*

 *tests*
development
design
(learning)

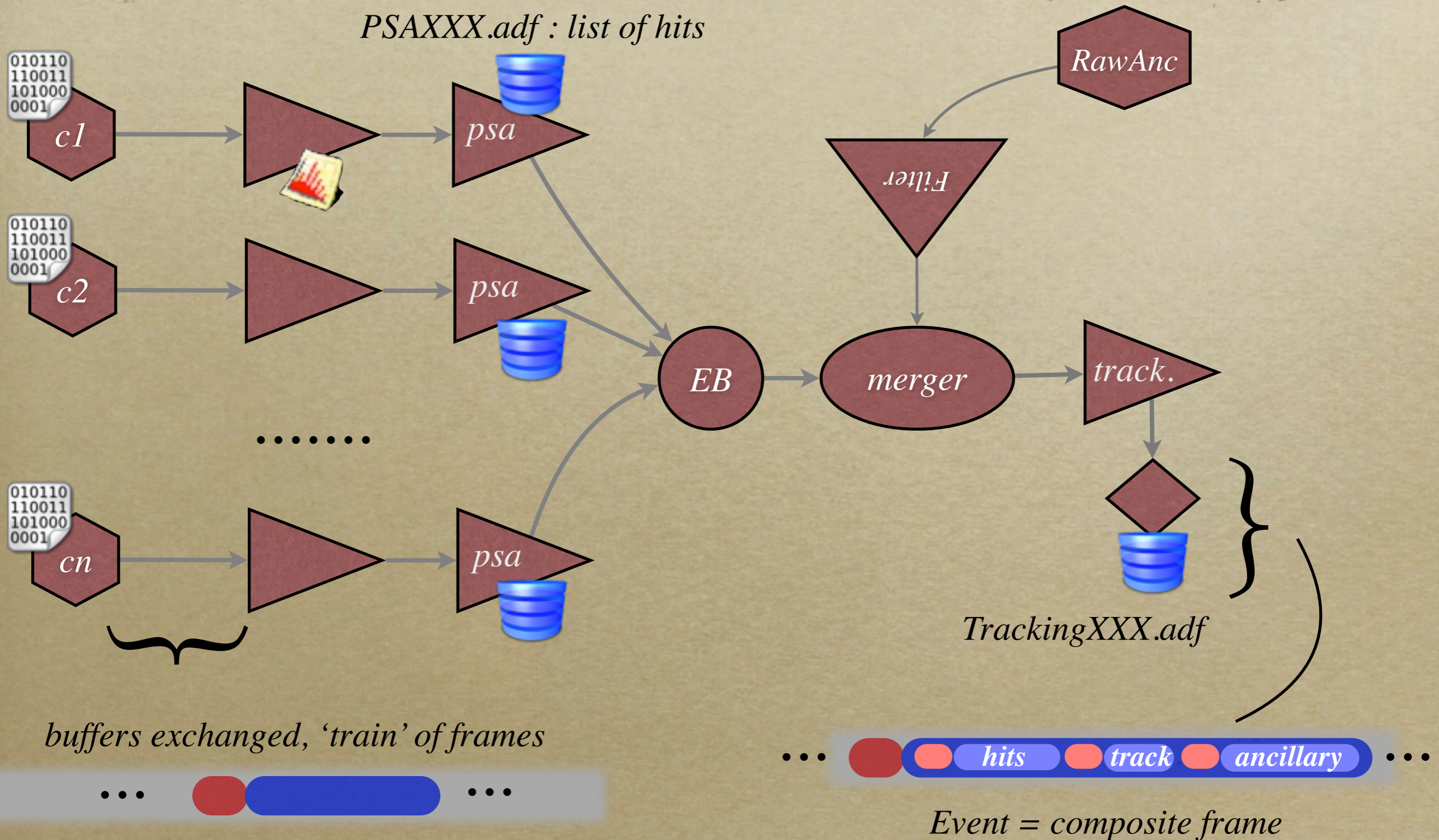
Some (my) definitions ...

- *NARVAL : DAQ, distributed system, written in ADA*
 - ☛ *allows to build complex topology of actors*
- *AGATA Data Processing Package (ADPP, also narval emulator)*
 - ☛ *C/C++ actors processing the data flow (PSA, Tracking, ...)*
- *Emulators : C/C++ program/framework*
 - ☛ *try to do as NARVAL. So far on single PC*
- *GO4 : Data analysis framework of GSI*
 - ☛ *based on ROOT/QT*

Situation @ Legnaro



Situation @ Legnaro



and @ GSI

GO4 / MBS

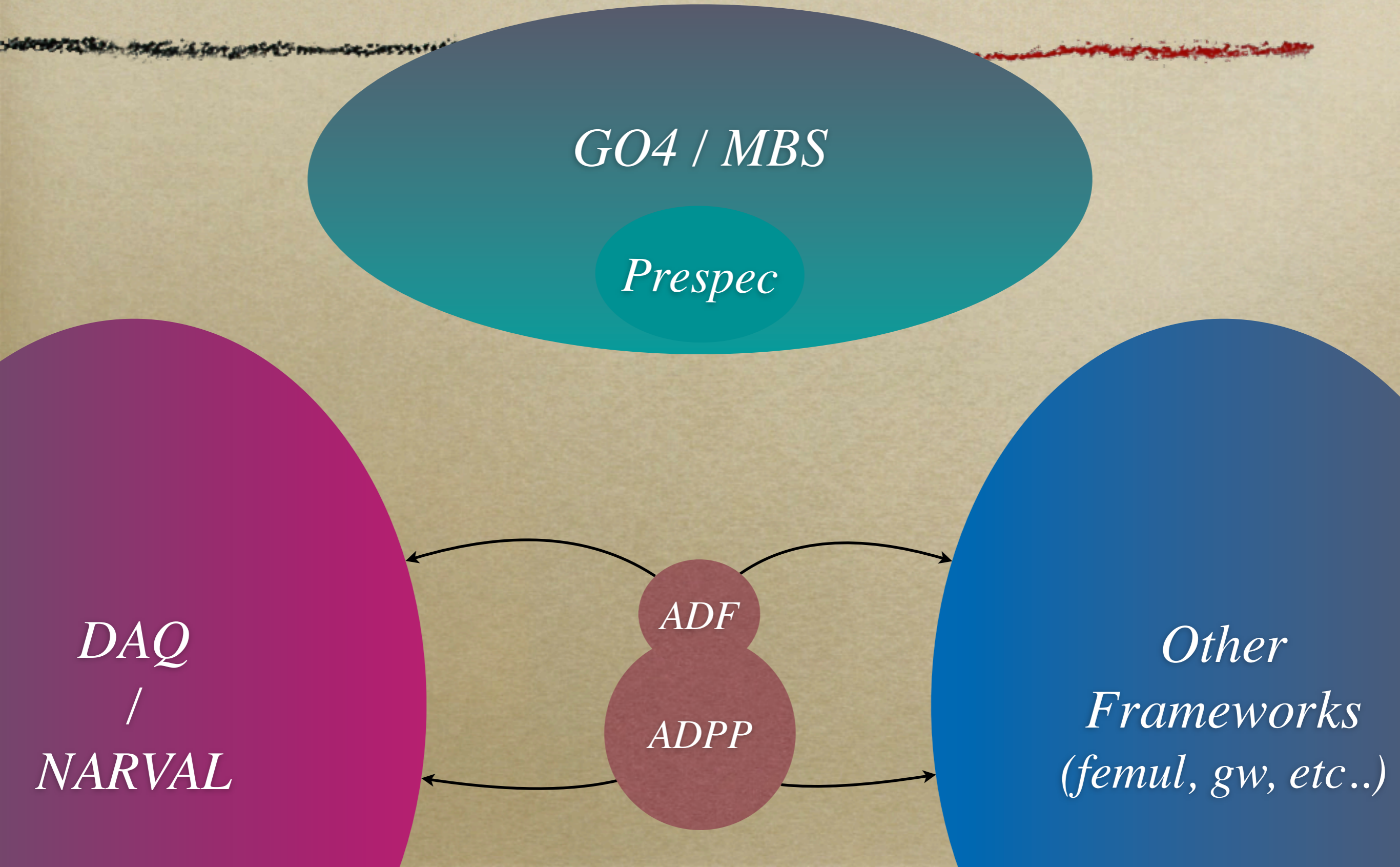
Prespec

*DAQ
/
NARVAL*

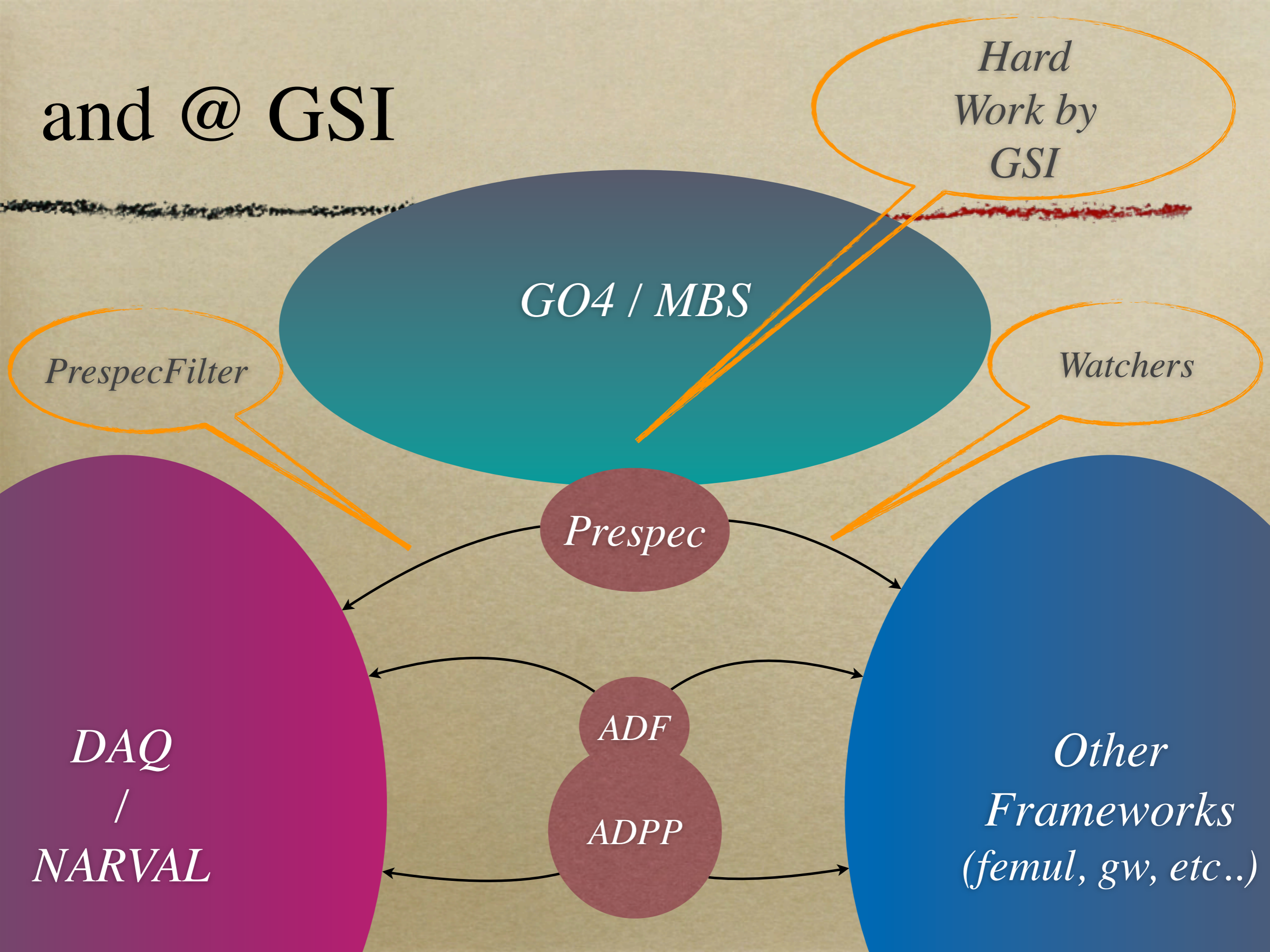
ADF

ADPP

*Other
Frameworks
(femul, gw, etc..)*



and @ GSI



*Hard
Work by
GSI*

PrespecFilter

Watchers

Prespec

ADF

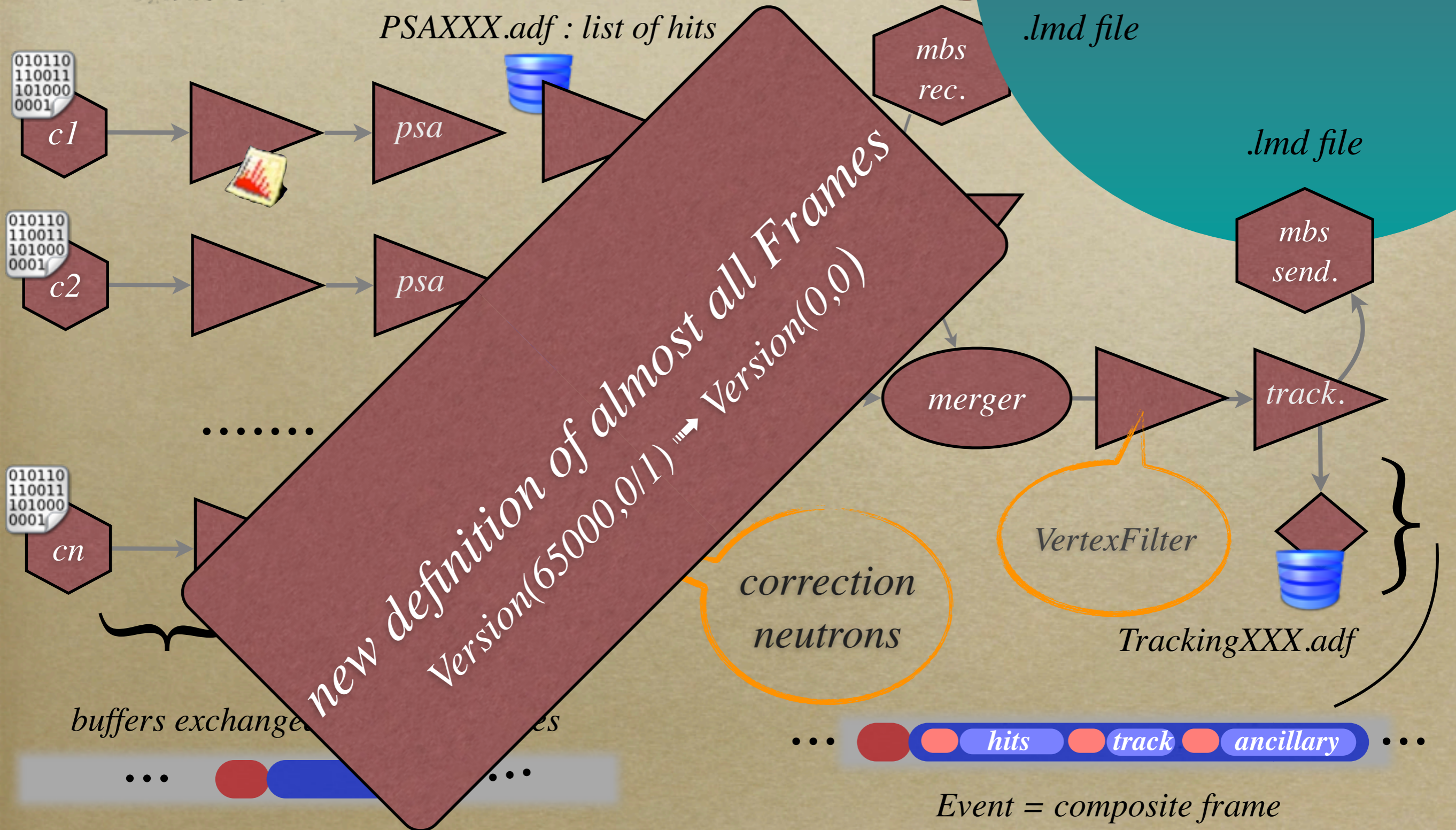
ADPP

*DAQ
/
NARVAL*



*Other
Frameworks
(femul, gw, etc..)*

and @ GSI

GO4 / MBS



From Legnaro to GSI ...

- *Watchers (spectra, TTree) for LaBr3* 
- *EGAN workshop [school] @ Liverpool*
 - ☞ *Lectures + practical sessions*
- *few modifications to have GW compiling with clang[✓]*
- *cmake* as building system* 
- ☞ *ADPP, GW, ADF, Prespec*

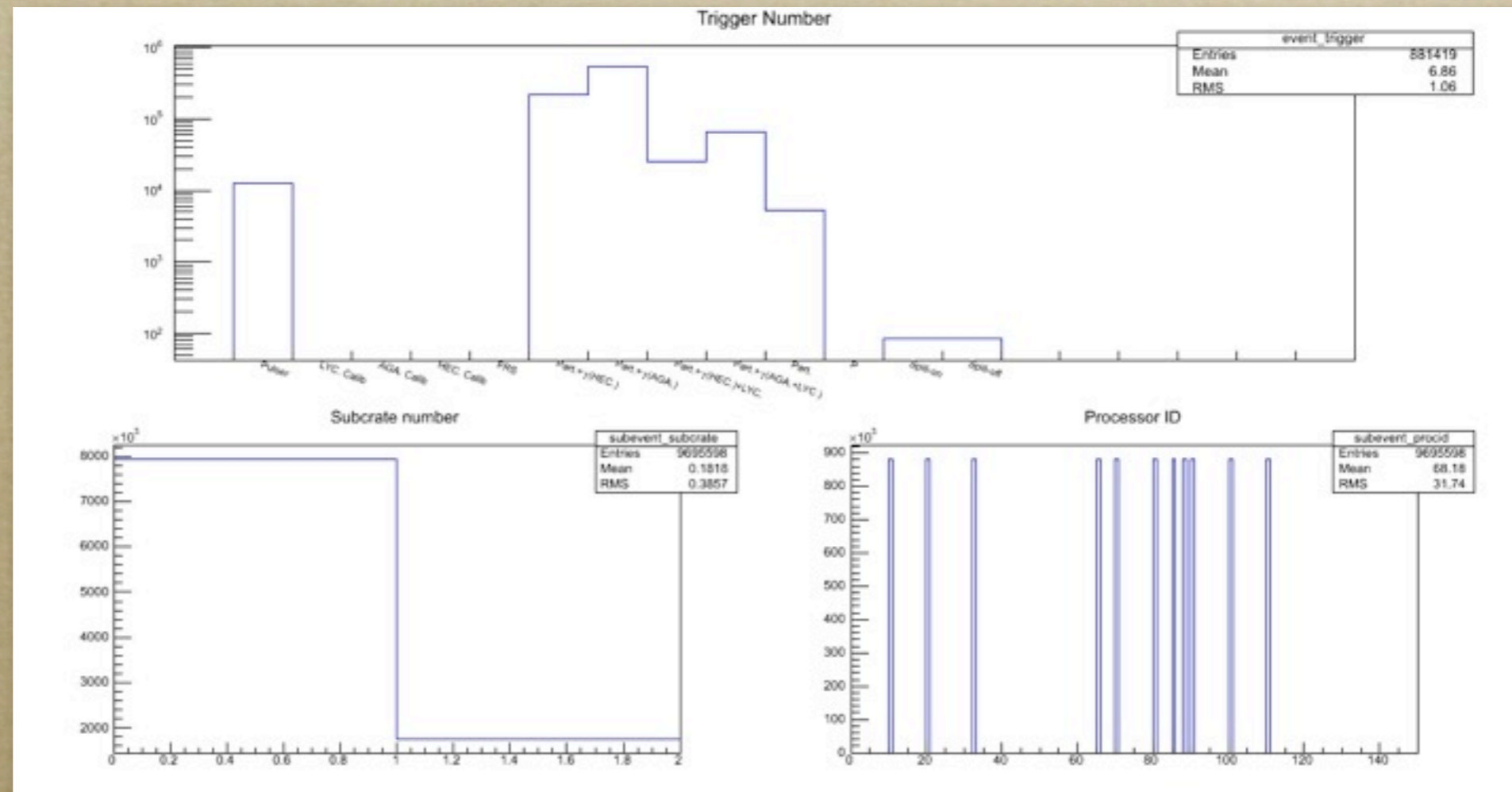
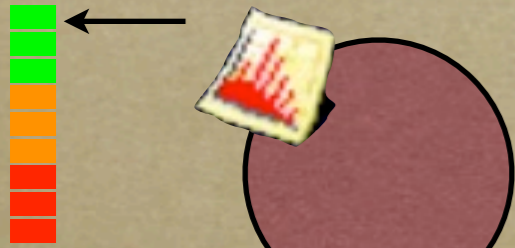
* modern building system: G4, ROOT use it
announced last AGATA week

GSI/GW/Watchers

Watcher : task to one (several) frame(s)

↳ *most of the time, spectra ... but not only*

MBSWatcher



...



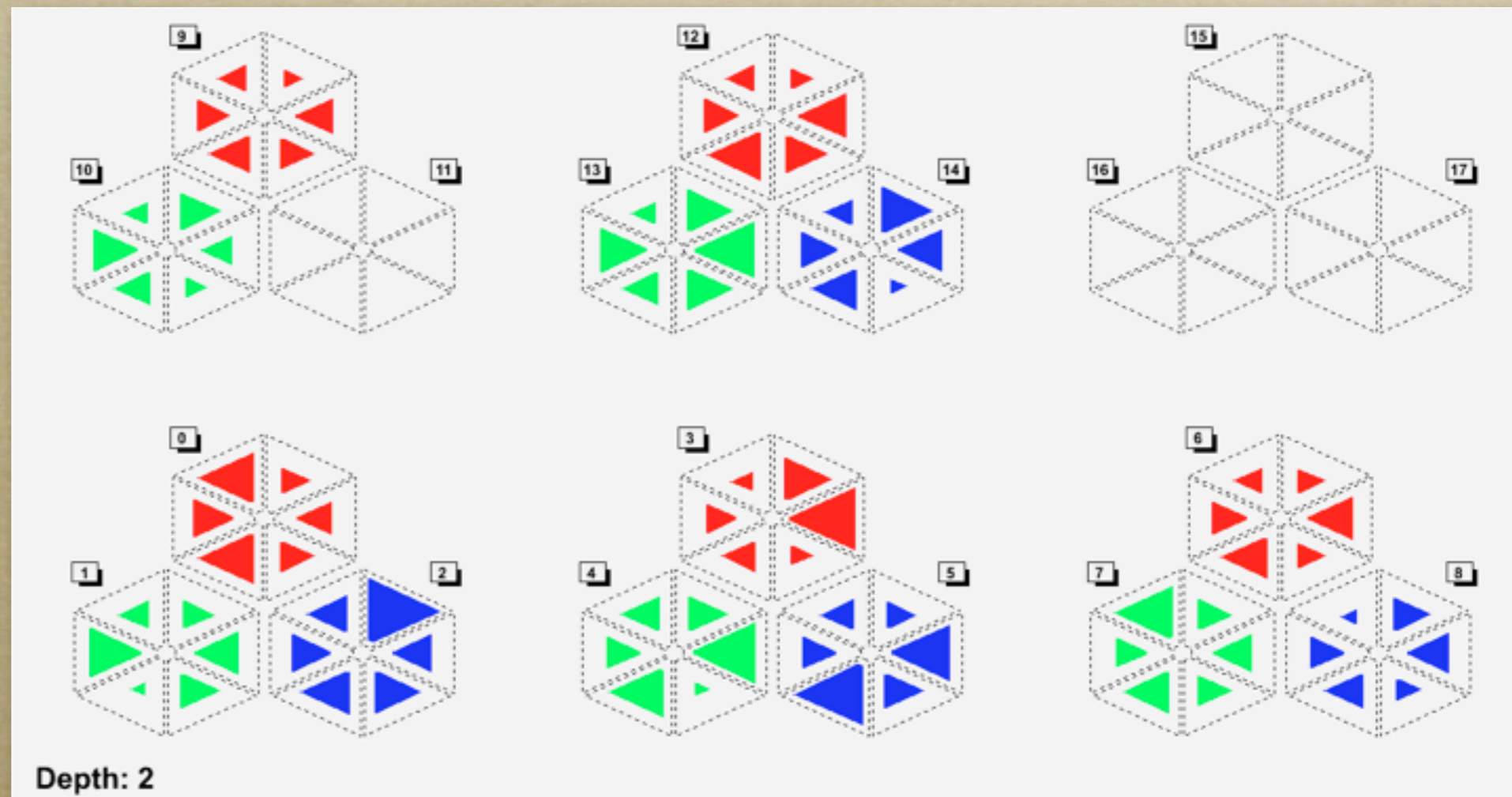
mbs data

...

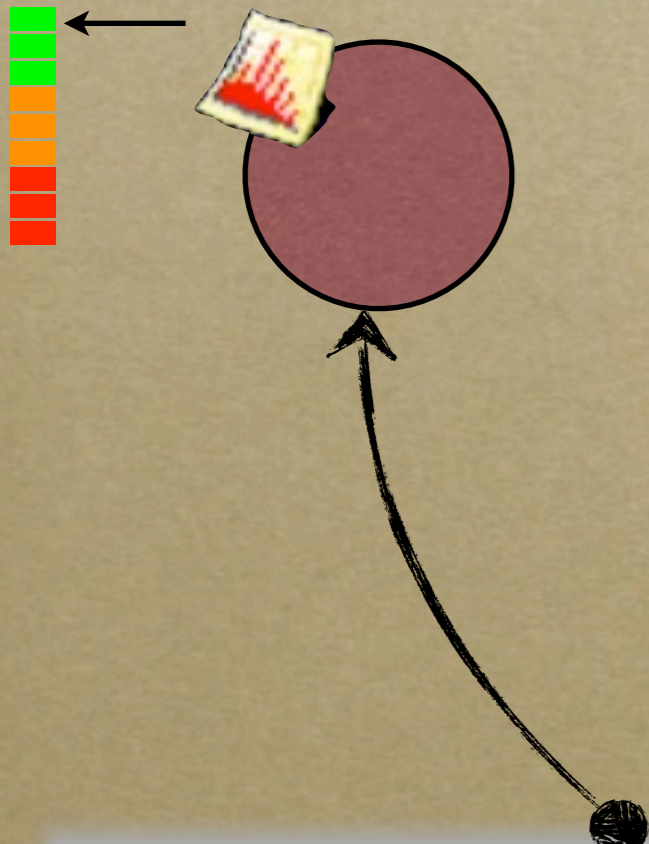
GSI/GW/Watchers

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MBSWatcher



...



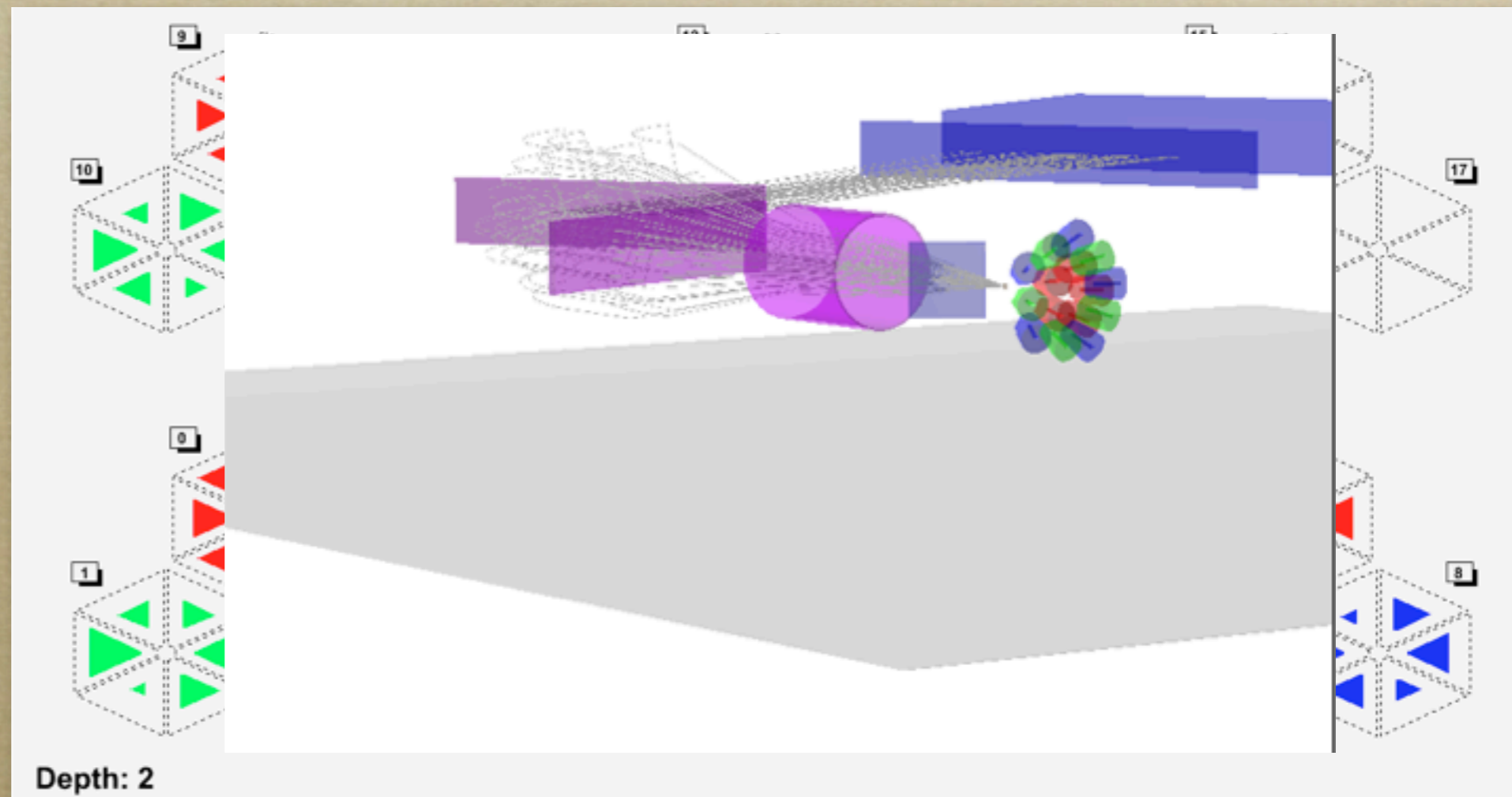
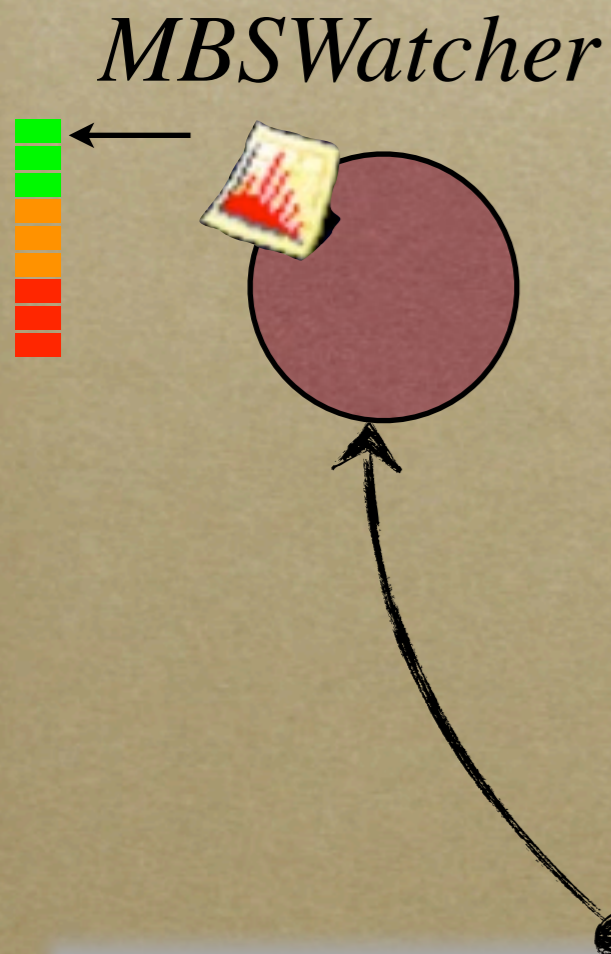
mbs data

...

GSI/GW/Watchers

Watcher : task to one (several) frame(s)

↳ *most of the time, spectra ... but not only*



...

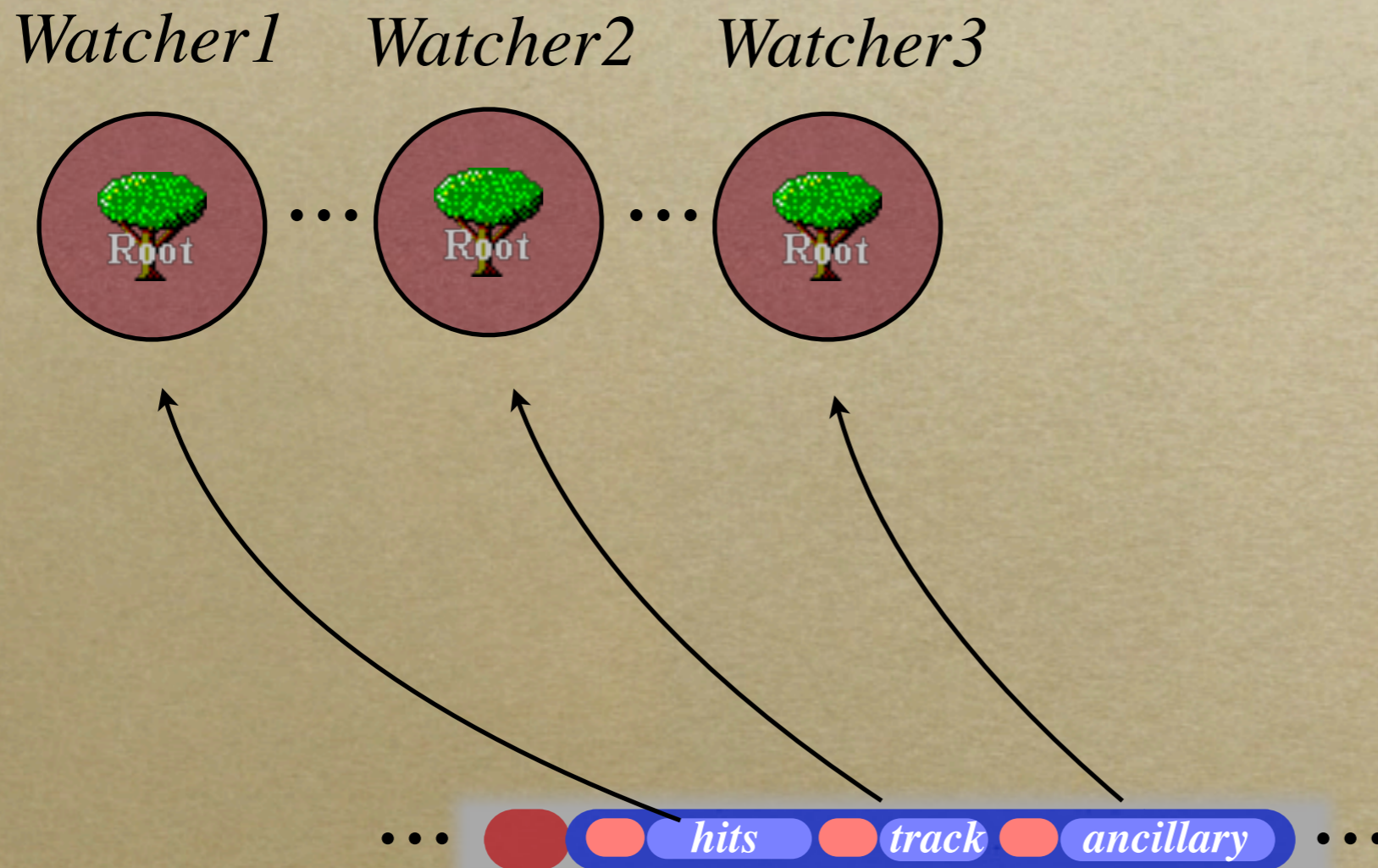


mbs data

...

GSI/GW/Watchers

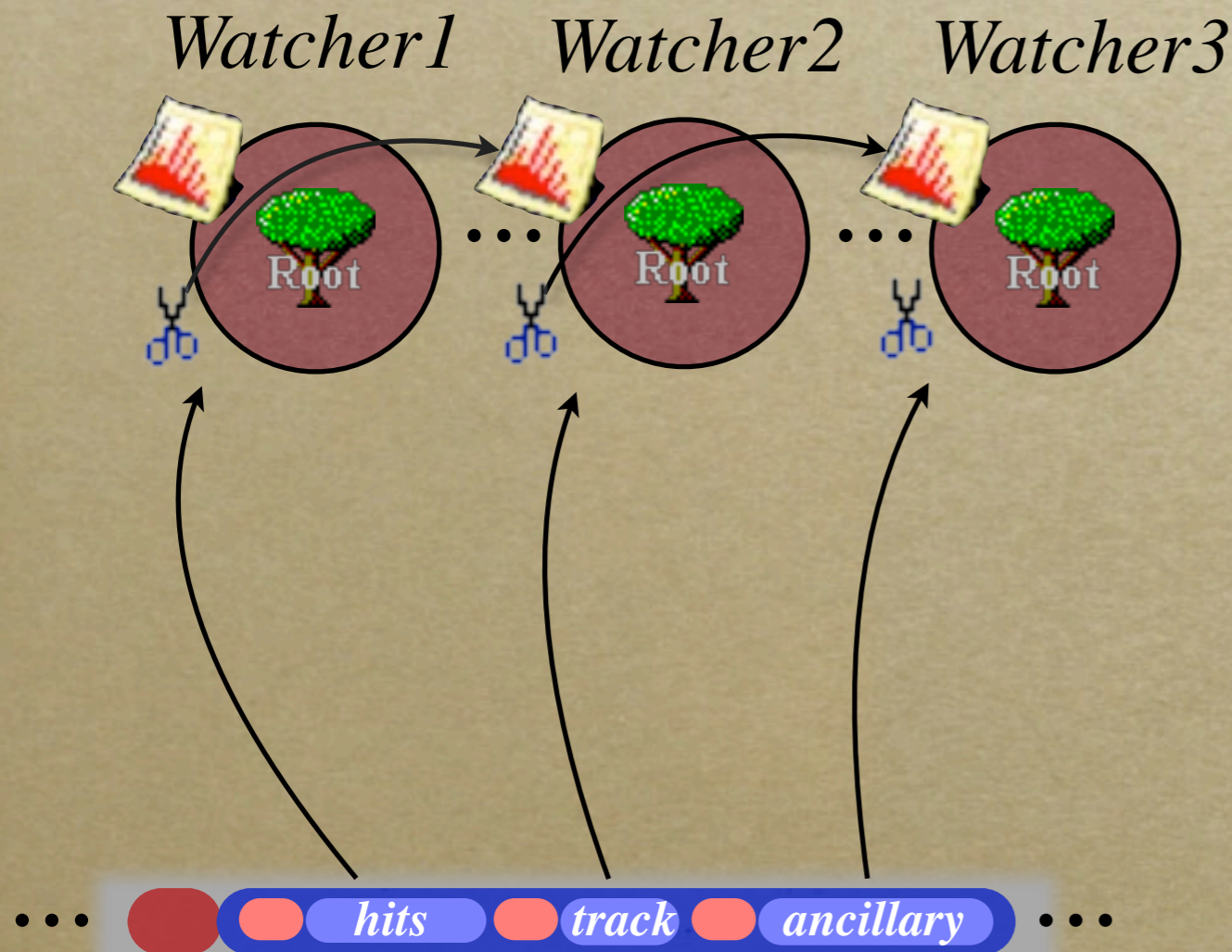
Watchers could be chained, build ROOT Tree



GSI/GW/Watchers

Watchers could be chained, build ROOT Tree

NEW :



- *spectra*



- *conditions*

'à la GO4' Graph. cond. 1D/2D
*Expression 'à la root' $x*y > 10$*

- *event list*

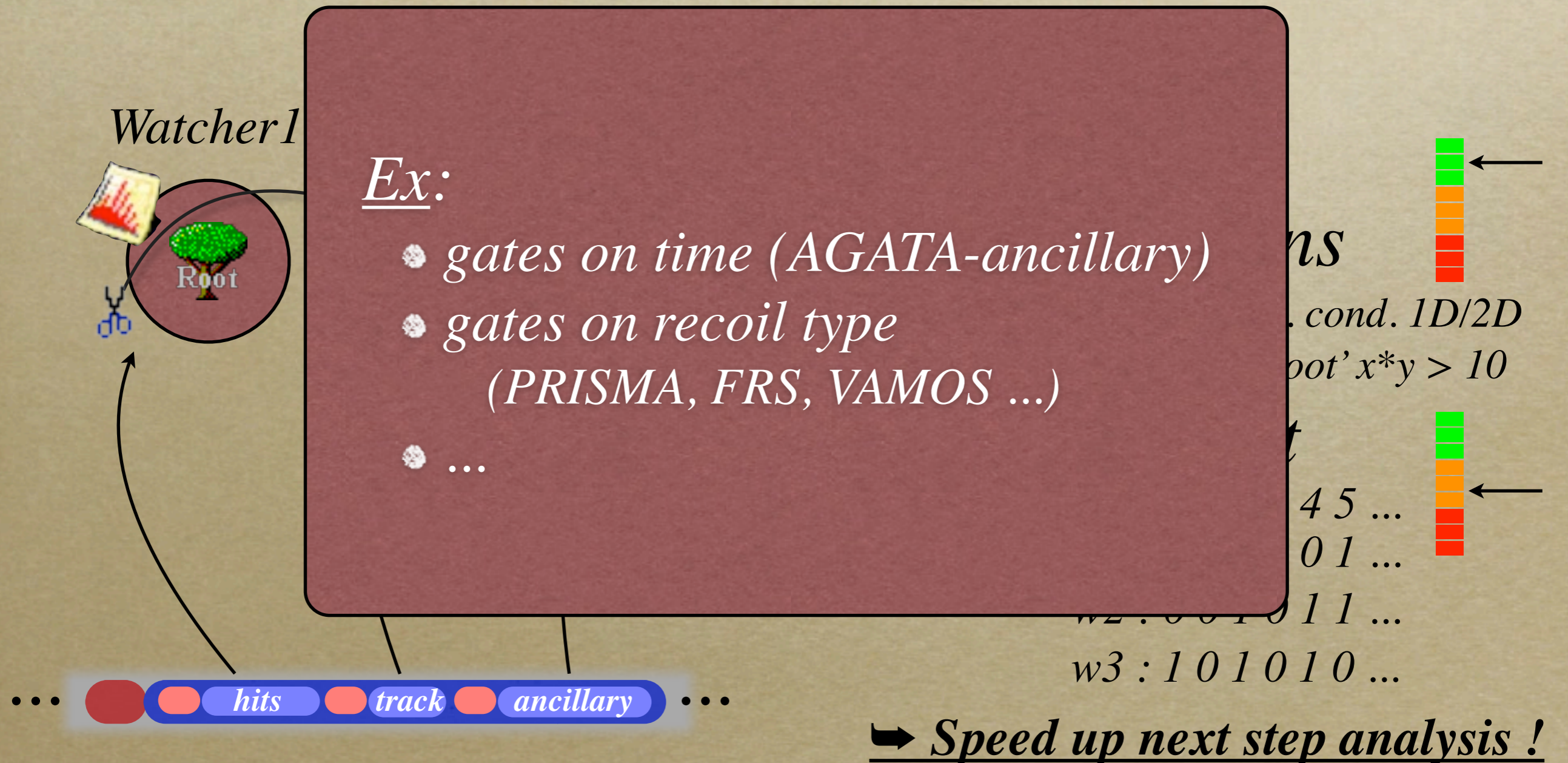
E# : 0 1 2 3 4 5 ...
w1 : 1 0 1 0 0 1 ...
w2 : 0 0 1 0 1 1 ...
w3 : 1 0 1 0 1 0 ...



➔ *Speed up next step analysis !*

GSI/GW/Watchers

Watchers could be chained, build ROOT Tree



How it looks like ?

The screenshot displays the ROOT Object Browser interface. On the left, a file tree shows a directory structure under 'Spectra.root' with sub-directories 'W1' and 'W2'. The 'W1' directory contains objects 'X', 'XCUT', 'XY', and 'XYCUT'. The 'W2' directory contains objects 'mult', 'x', 'y', 's', and 'p'. The main canvas area contains two histograms:

- X distribution:** A histogram showing the distribution of the 'X' variable. The x-axis ranges from -1 to 5, and the y-axis ranges from 0 to 3000 (scaled by $\times 10^3$). Two red hatched bars are visible at approximately x=1.5 and x=2.5. A blue box highlights the region from x=1 to x=3. A statistics table for 'X' is shown to the right:

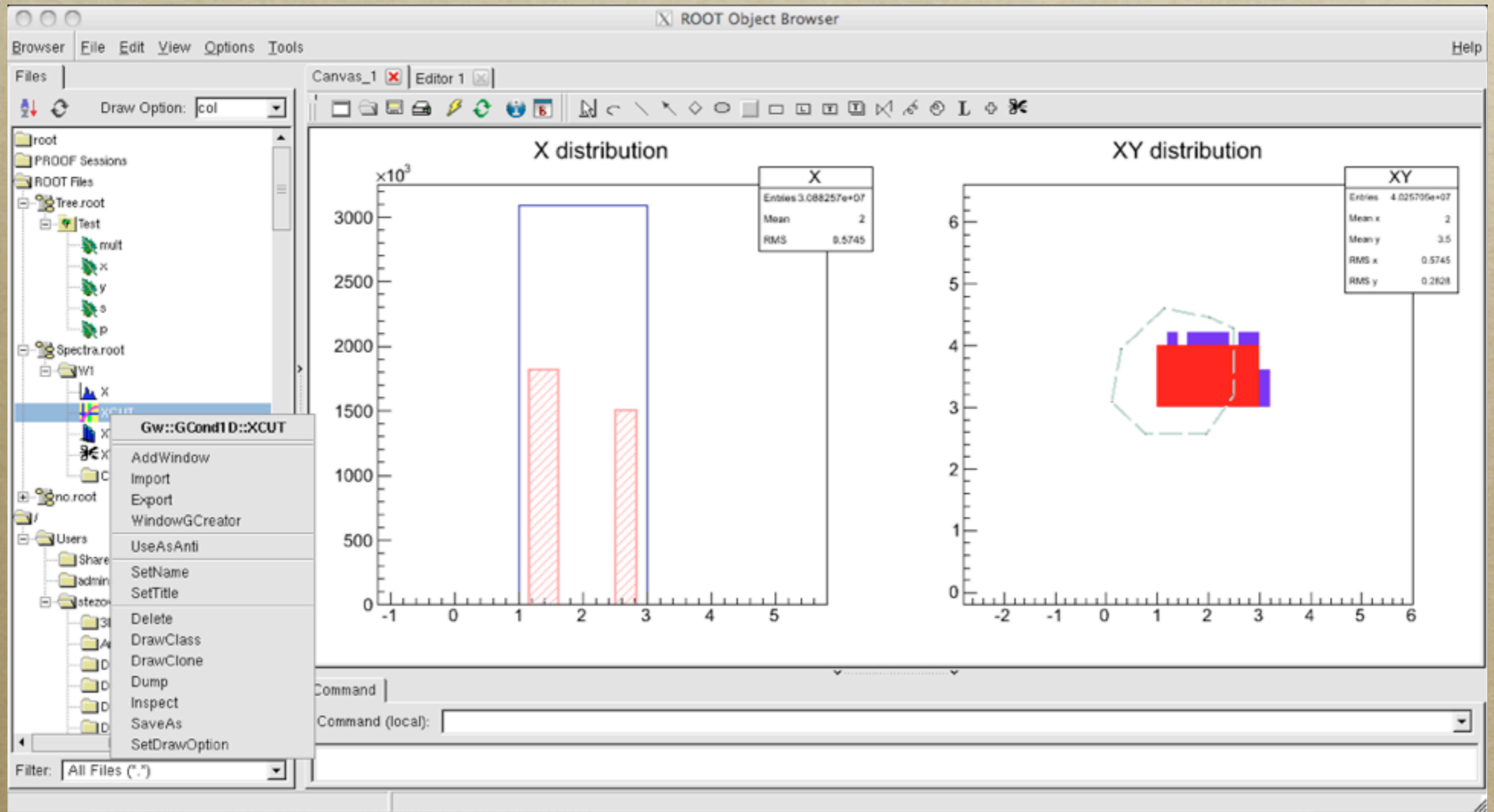
X	
Entries	3.088257e+07
Mean	2
RMS	0.5745

- XY distribution:** A 2D histogram showing the distribution of the 'XY' variable. The x and y axes both range from -2 to 6. A red hatched region is visible, centered around x=2 and y=3.5. A green dashed octagon outlines a region around the data. A statistics table for 'XY' is shown to the right:

XY	
Entries	4.025705e+07
Mean x	2
Mean y	3.5
RMS x	0.5745
RMS y	0.2828

At the bottom of the interface, there is a 'Command' field and a 'Command (local):' dropdown menu.

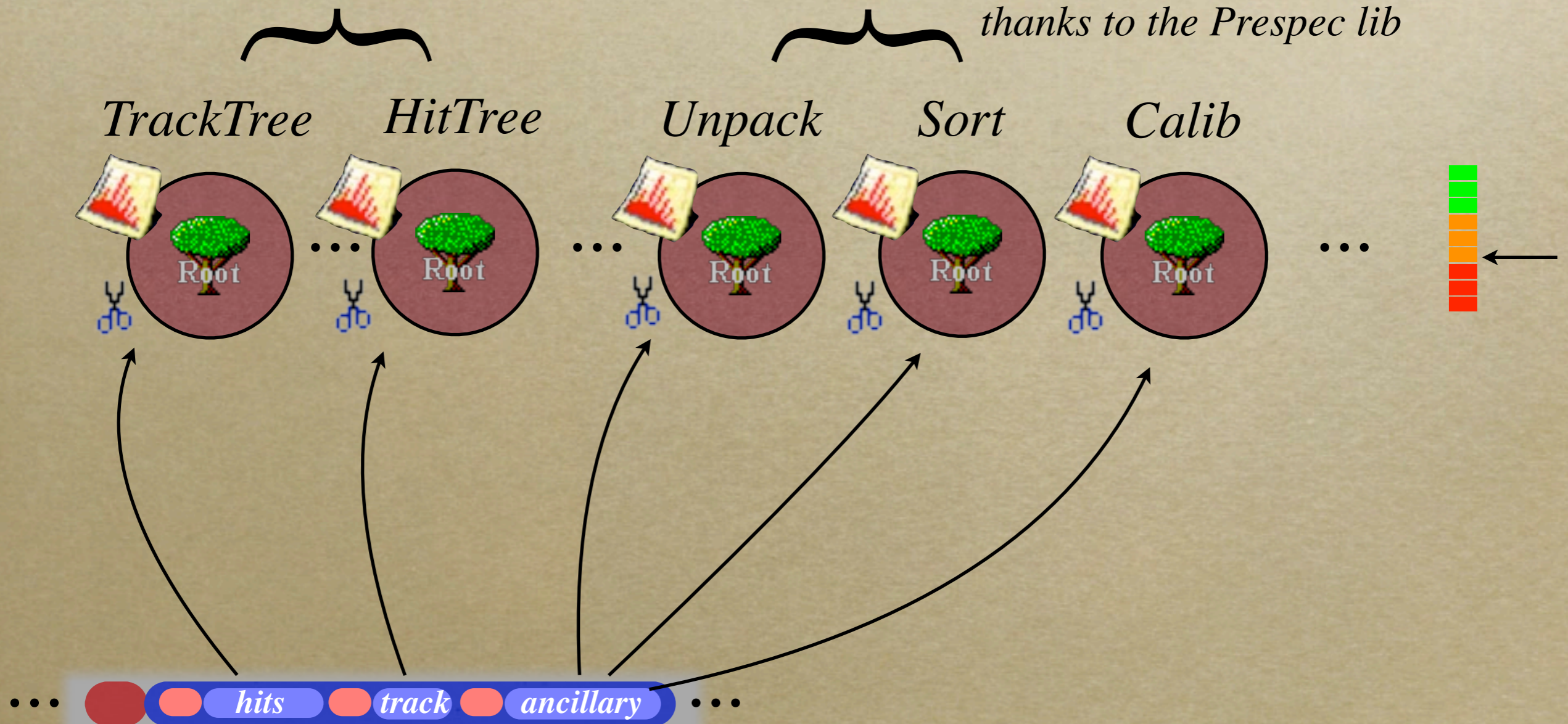
How it looks like ?



GSI/GW/Watchers

already done since Legnaro

*standard way to do in GO4, also in GW
thanks to the Prespec lib*



ROOT Object Browser

Browser File Edit View Options Tools Help

Files

Draw Option: [v]

- root
 - PROOF Sessions
 - ROOT Files
 - UnpackTree.root
 - TreeMaster;6
 - UnpackData
 - detBP[16]
 - detHP**
 - or Num[16]
 - vme0[21][32]
 - vme1[5][32]
 - vme2[2][32]
 - vme2s[32][10]
 - nhit5[32]
 - vme3[2][32]
 - vme10[8][32]
 - vme10s[2][128][3]

Filter: All Files (*.*)

Canvas_1 [x] Editor 1 [x]

UnpackData.detHP

htemp	
Entries	77844
Mean	3.025e+04
RMS	1.771e+04

Command

Command (local): [v]

*also in GW
Prespec lib*

b



...

... **hits** **track** **ancillary** ...

ROOT Object Browser

Browser File Edit View Options Tools Help

Files

Draw Option: []

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Filter: All Files (*.*)

Canvas_1 [X] Editor 1 [X]

UnpackData.detHP

htemp
 Entries 77844
 Mean 3.025e+04
 RMS 1.771e+04

also in GW
 Prespec lib

b

TreeViewer

File Edit Run Options Help

Command [] Option [] Histogram htemp Hist Scan Rec

Current Folder

- TreeList
 - TreeMaster
 - UnpackData

Current Tree : TreeMaster

X: -empty-	E: -empty-	or Num []	nhit10 [] []	Ly1 []
Y: -empty-	E: -empty-	vme0 [] []	vme11 [] []	vme []
Z: -empty-	E: -empty-	vme1 [] []	vme11s [] []	vme []
-empty-	E: -empty-	vme2 [] []	nhit11 []	nhit: []
Scan box	E: -empty-	vme2s [] []	vme13 [] []	vme []
E: -empty-	E: -empty-	nhit5 []	vme13s [] [] []	vme []
E: -empty-	UnpackData	vme3 [] []	nhit13 [] []	nhit []
E: -empty-	detBP []	vme10 [] []	vme13sa [] []	n_tr []
E: -empty-	detHP	vme10s [] [] [] []	nhit13a []	[]

SPIDER STOP

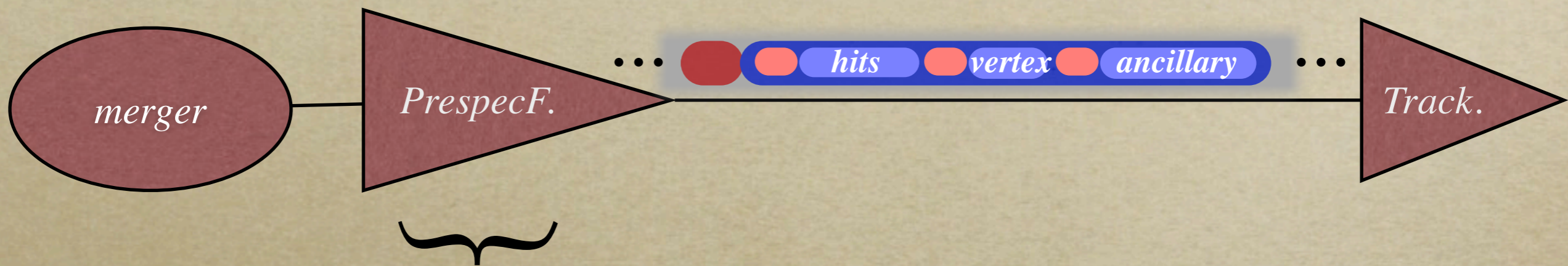
IList [] OList [] First entry : 0 Last entry : 77843

0%

RESE

... hits track

GSI / ADF / PrespecFilter



Task:

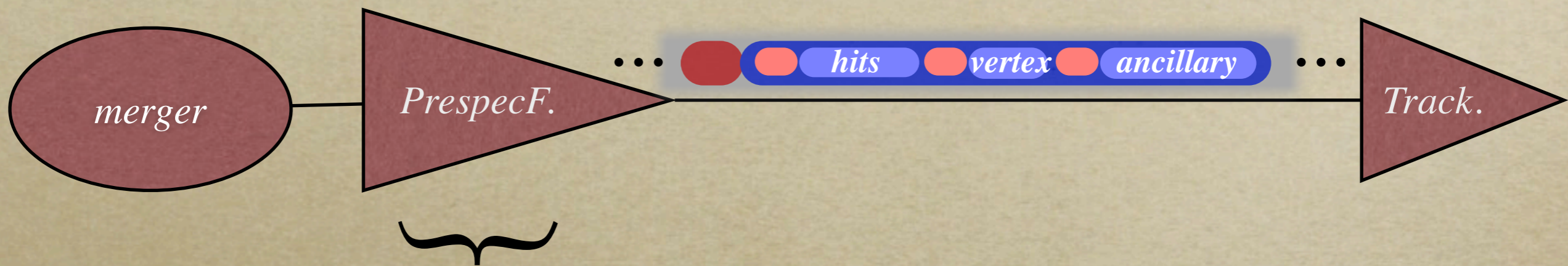
provide position of the recoil to tracking

Solution:

compute (LYCCA) a Vertex Frame $(\mathbf{x}, \mathbf{y}, \mathbf{z}, u_x, u_y, u_z, \beta)$

add it to the data flow

GSI / ADF / PrespecFilter

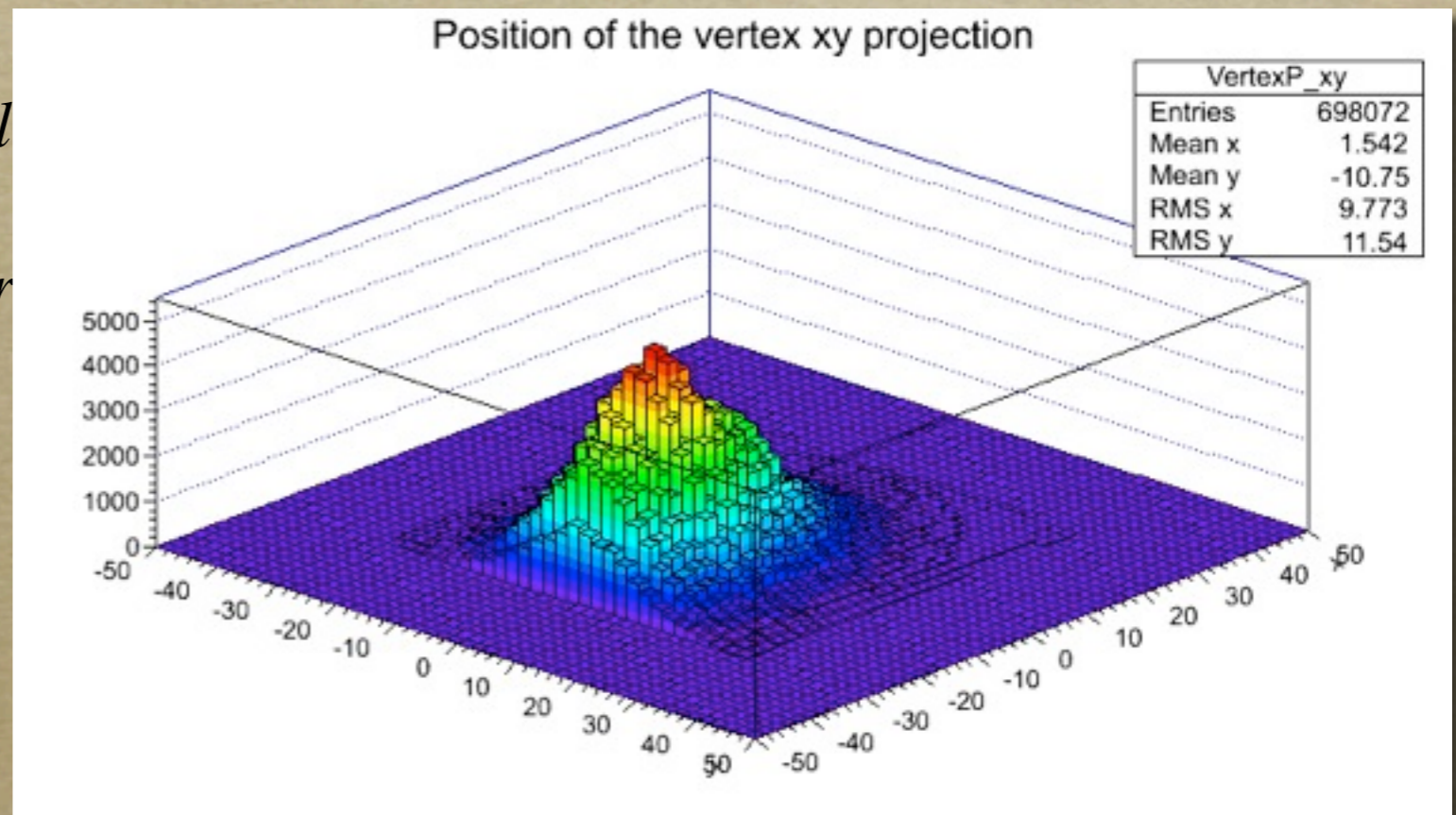


Task:

provide position of the recoil

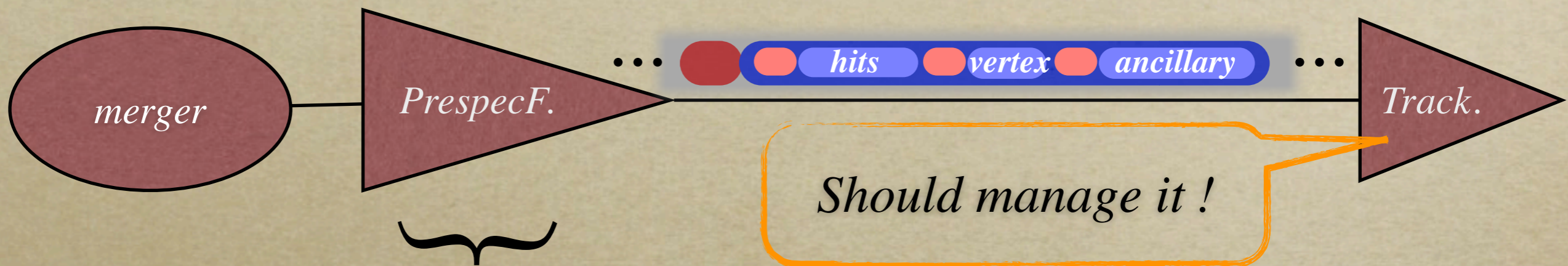
Solution:

*compute (LYCCA) a Vertex Fr
add it to the data flow*



obtained with watcher on vertex connected to prespec filter output

GSI / ADF / PrespecFilter

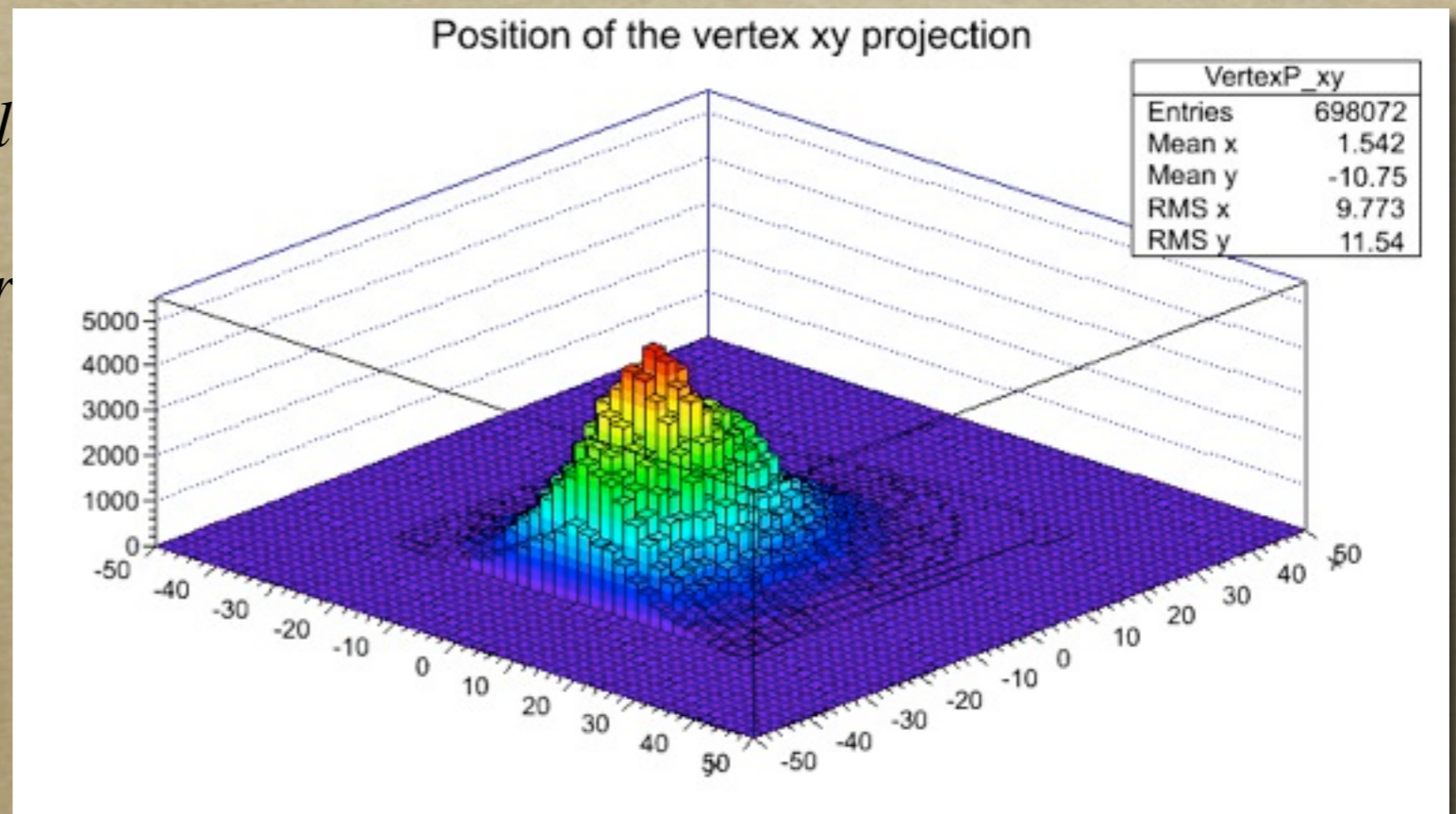


Task:

provide position of the recoil

Solution:

*compute (LYCCA) a Vertex Fr
add it to the data flow*



obtained with watcher on vertex connected to prespec filter output

Conclusions

- *Online/Offline data analysis should be ok*

- ↳ *in the AGATA world*

- ↳ *in the GO4 world*

+ more doc
+ GUI facilities

- *new features available*

- *Prespec Filter : operational soon*

Future

- *Full emulator in GW**

- ↳ *on a single computer (multi-thread or not)*

- ↳ *on a cluster / GRID*



** announced last AGATA week ... but delayed because of Tree with conditions developments*