Atlfast, Artemis and Atlantis

What, Where and How

Documentation

Atlfast: C++ version of Atlfast in Athena

http://www.hep.ucl.ac.uk/atlas/atlfast

Artemis: Package to help writing C++ analyses

http://www.hep.ucl.ac.uk/atlas/Artemis

JiveXML: Athena data →XML files for Event display

http://www.hep.ucl.ac.uk/atlas/JiveXML

Atlantis: Standalone Event Display

http://atlantis.web.cern.ch/atlantis

ATLAS software framework: Athena

ATHENA provides services (e.g. ntuple writing) for applications (e.g. Atlfast).

Many applications can be run in the same job

Example: in same job, read in DC1 data, process 4-vectors with Atlfast, process Geant output with Full Reconstruction. Compare with Artemis.

Can run several versions of application concurrently

e.g. run Atlfast twice with different parameters

Comments on running jobs - Ntuples

You need to checkout and build TestRelease

from Atlas Home page → computing → development→user guide →section 5

You might want to edit the supplied jobOptions files.

But you do not need to touch the code.

Ntuple type (Paw/Root) is handled by Athena.

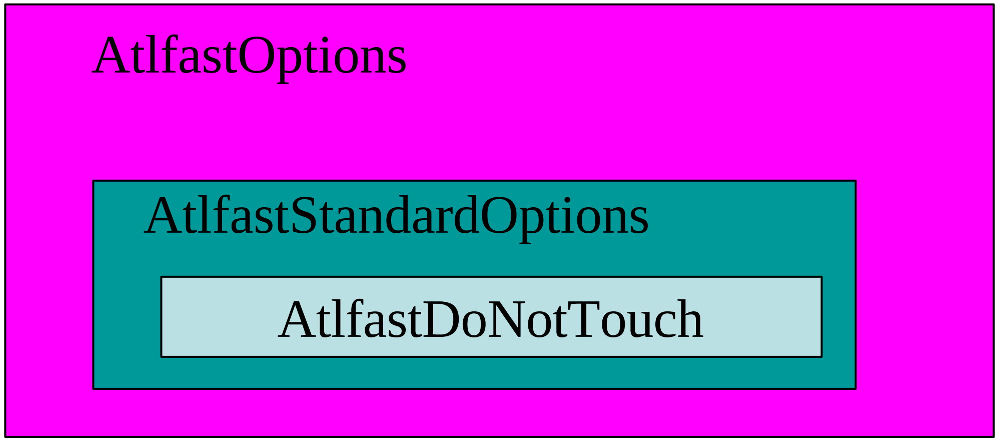
set in jobOptions

CBNT contains much information from generators, Atlfast and full reconstruction. See RecExCommon examples.

Atlfast can also produce its own smaller ntuple.

Atlfast - JobOptions

Atlfast jobOptions.txt - nested include files



AtlfastOptions

AtlfastStandardOptions

AtlfastDoNotTouch

AtlfastOptions: Athena stuff (eg Paw or Root ntuples)
StandardOptions: user settable parameters + optional algorithms
DoNotTouch: algs that must be run correct order

Atlfast (C++) version runs in Athena

Integration with offline ATLAS software:

- JetRec jet algorithms (including Kt algorithm)
  - as well as traditional Atlfast cone algorithms
- FastShower
  - shower parameterisation
- Artemis
  - for handling atlfast and full reco with same code
- Atlantis
  - for a detailed event display

Artemis - Who?

Artemis - a package to help writing C++ analyses

Artemis is aimed at the physicist who:

- wants to write analysis code in C++
- is fairly new to C++ and OO programming
- would appreciate that standard tasks are provided
- is willing to try a new (and strange) environment

Artemis - What?

- Analysis classes representing particles, jets, cells.
- Common interface to all sources of data:
  - same code runs on Atlfast, Full reconstruction objects
- Library of tools for common tasks.
  - Sorting, mass calculations,
- Example jobs and jobOption files
- User package with skeleton algorithm to type into.

Common Interfaces

Artemis currently has 3 analysis types: Particle, Cell and Jet

Many different objects are created by Atlfast or Full Reconstruction.

User sees only the 3 analysis types - not the details of each object type.

e.g. User can process an Atlfast and Moore muons with the same code

.

Price: loss of special functionality.

Tools: Example 1
Object retrieval from the TDS

Bare handed retrieval: Container of Concrete types.

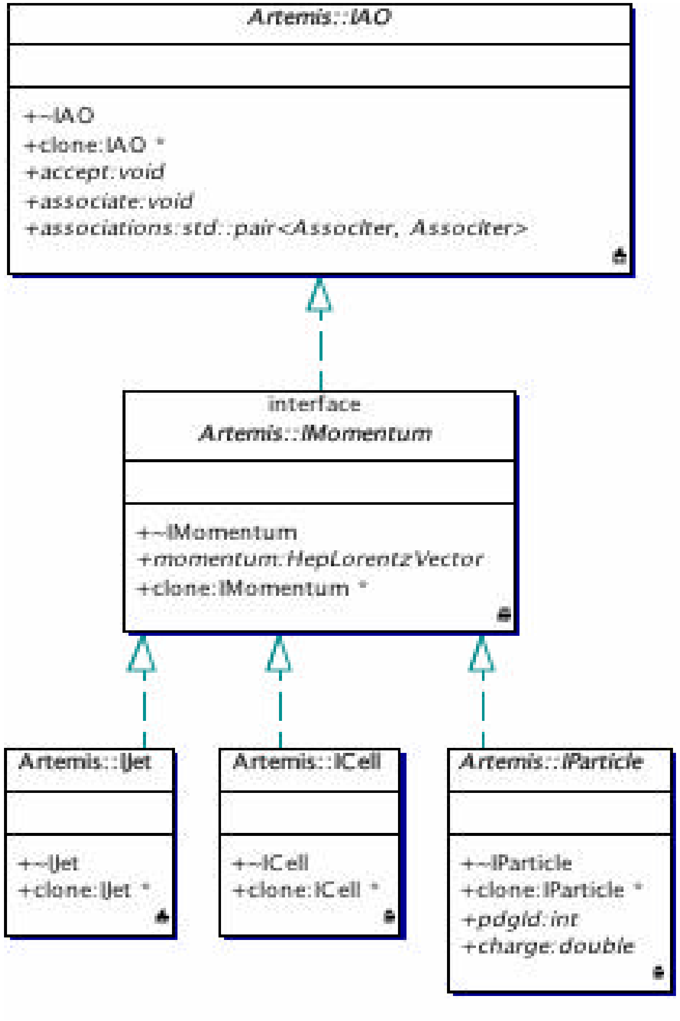
```
 const DataHandle<MuidTrackContainer> tracks;
   StatusCode sc2 = m_storeGate->retrieve(tracks,m_sgKey);
   if (sc2.isFailure()) {//take action….}
```

Artemis retrieval: includes conversion to Analysis Type.

```
ParticleCollection* afMuons =m_fromTDS->get<AtlfastParticles>(m_atlfastMuonKey);
```

destination type name what TDS address

Artemis Analysis Class Hierarchy



Navigation & Associations

can be arguments of functions of 4-momentum

User manipulates these

Details of connection to the underlying object are invisible to the user

Tools: Example 2
mass plots

```
ParticleCollection* afMuons =m_fromTDS->get<AtlfastParticles>(m_atlfastMuonKey);
```

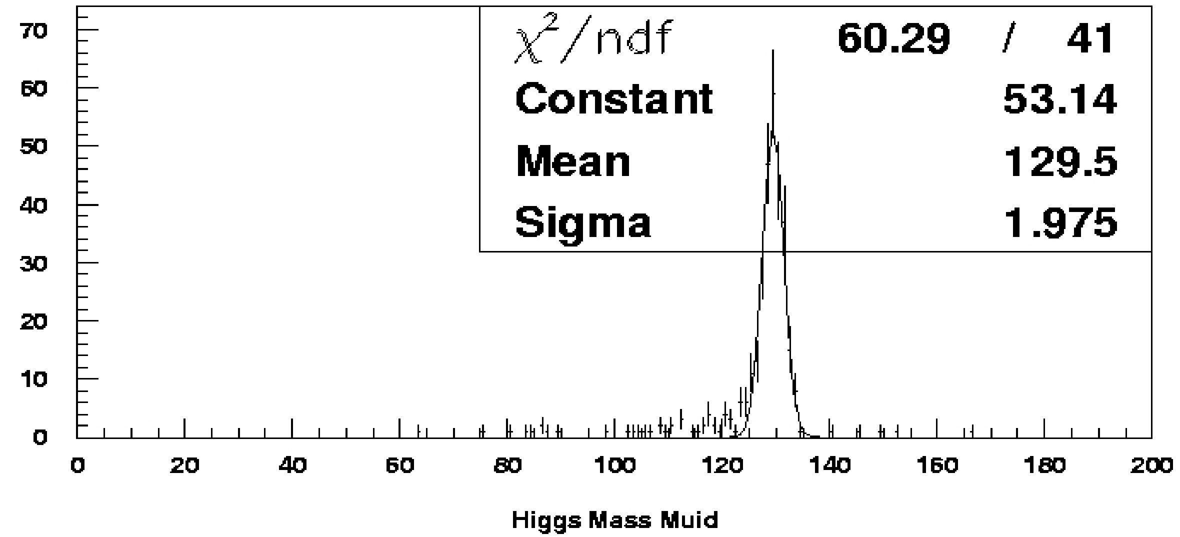
Retrieve Atlfast muons

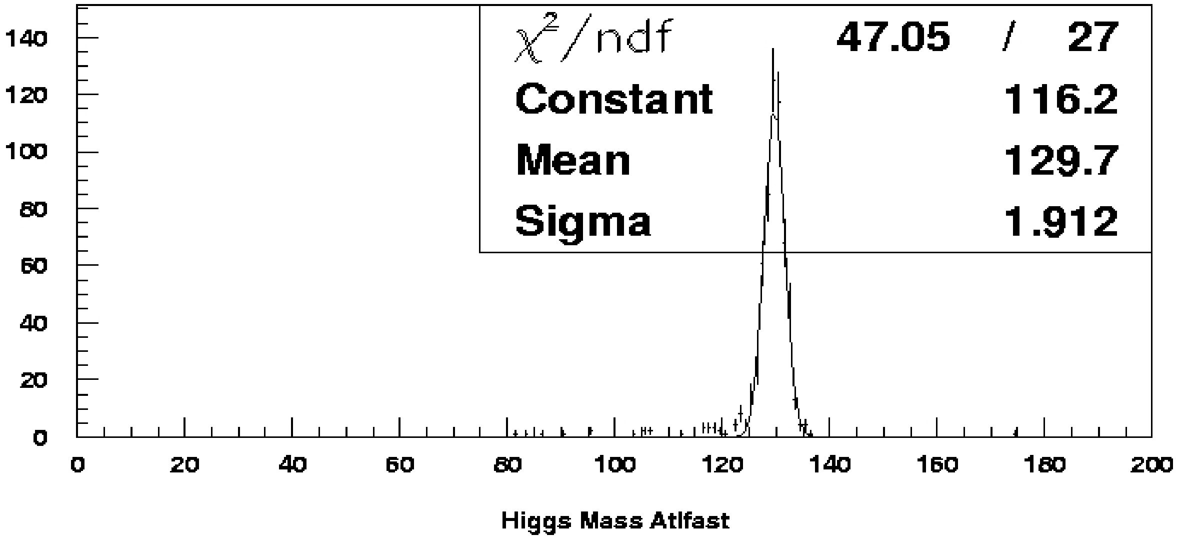
```
vector<double> masses = massCalculator(muons->begin(), muons->end(), 4);
```

calculate all combinations of masses from 4 muons

```
for_each(masses.begin(),  masses.end(),  FillHisto(myHisto));
```

plot each of these masses.


χ^2/ndf 60.29 / 41
Constant 53.14
Mean 129.5
Sigma 1.975
0
10
20
30
40
50
60
70
0
20
40
60
80
100
120
140
160
180
200
Higgs Mass Muid


χ^2/ndf 47.05 / 27
Constant 116.2
Mean 129.7
Sigma 1.912
0
20
40
60
80
100
120
140
0
20
40
60
80
100
120
140
160
180
200
Higgs Mass Atlfast

Artemis - status

New package! undergoing improvements

Example jobs which run on full reconstruction and Atlfast

- mass plots from 4 muons, 4 electrons, 2electrons+2 muons
- ntuple maker
- Jet and missing eT comparisons

We need interested users - we will work with them to expand and improve the package.

Artemis - how to use

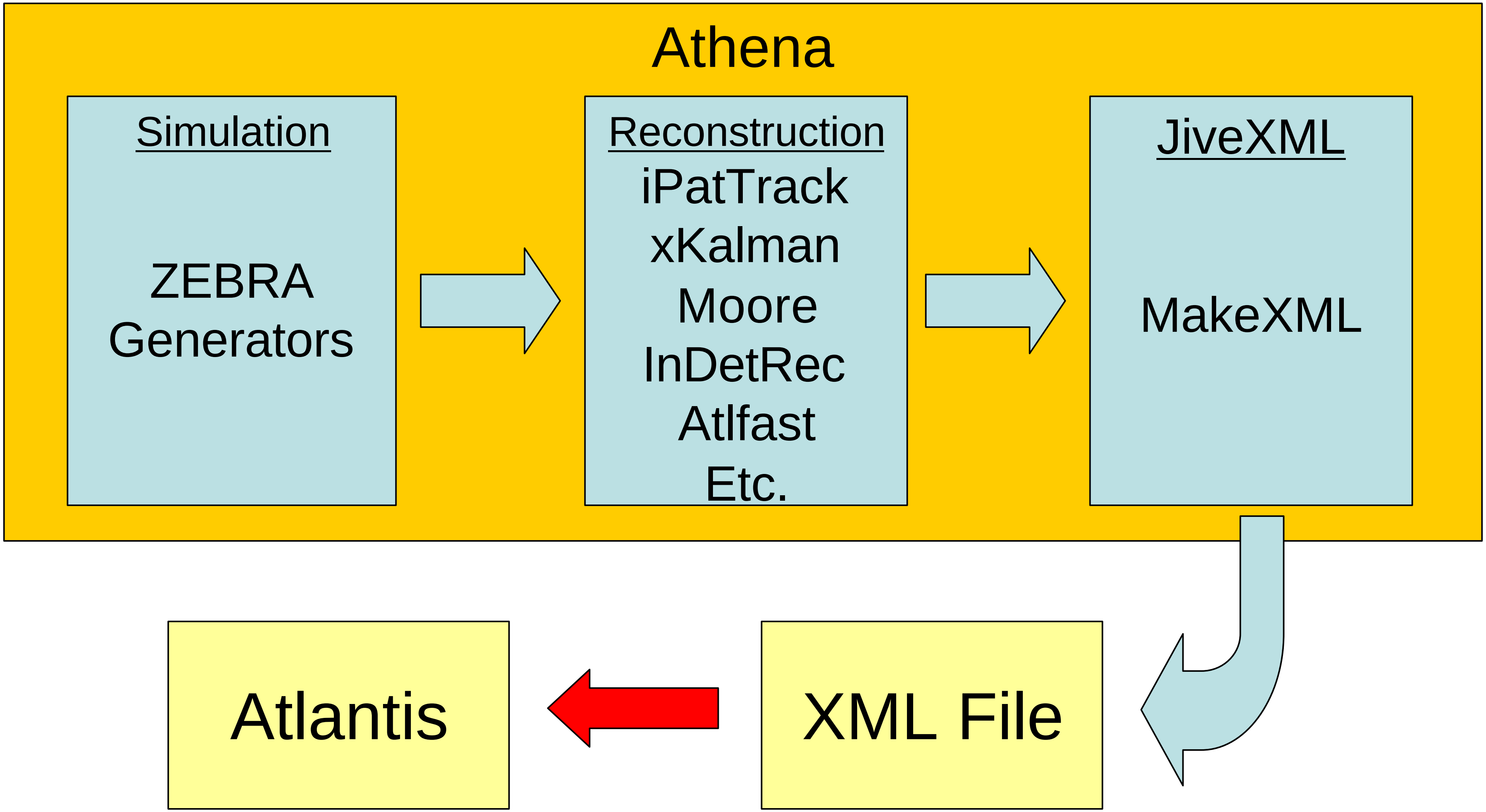
Skeleton job is in ArtemisUser: checkout and edit.

Example code in ArtemisAlgs - major part of the documentation

User guide from web site.

JobOptions difficult (upstream algs), but examples in ArtemisAlgs

JiveXML/Atlantis



Athena

Simulation

ZEBRA
Generators

Reconstruction
iPatTrack
xKalman
Moore
InDetRec
Atlfast
Etc.

JiveXML

MakeXML

XML File

Atlantis

Atlfast Information Displayed

- Jets
- Clusters
- Cells
- Reconstructed Particles
- Reconstructed Tracks
- Truth Tracks
- Truth Particles

How To Run

- Add to requirements file in TestRelease:

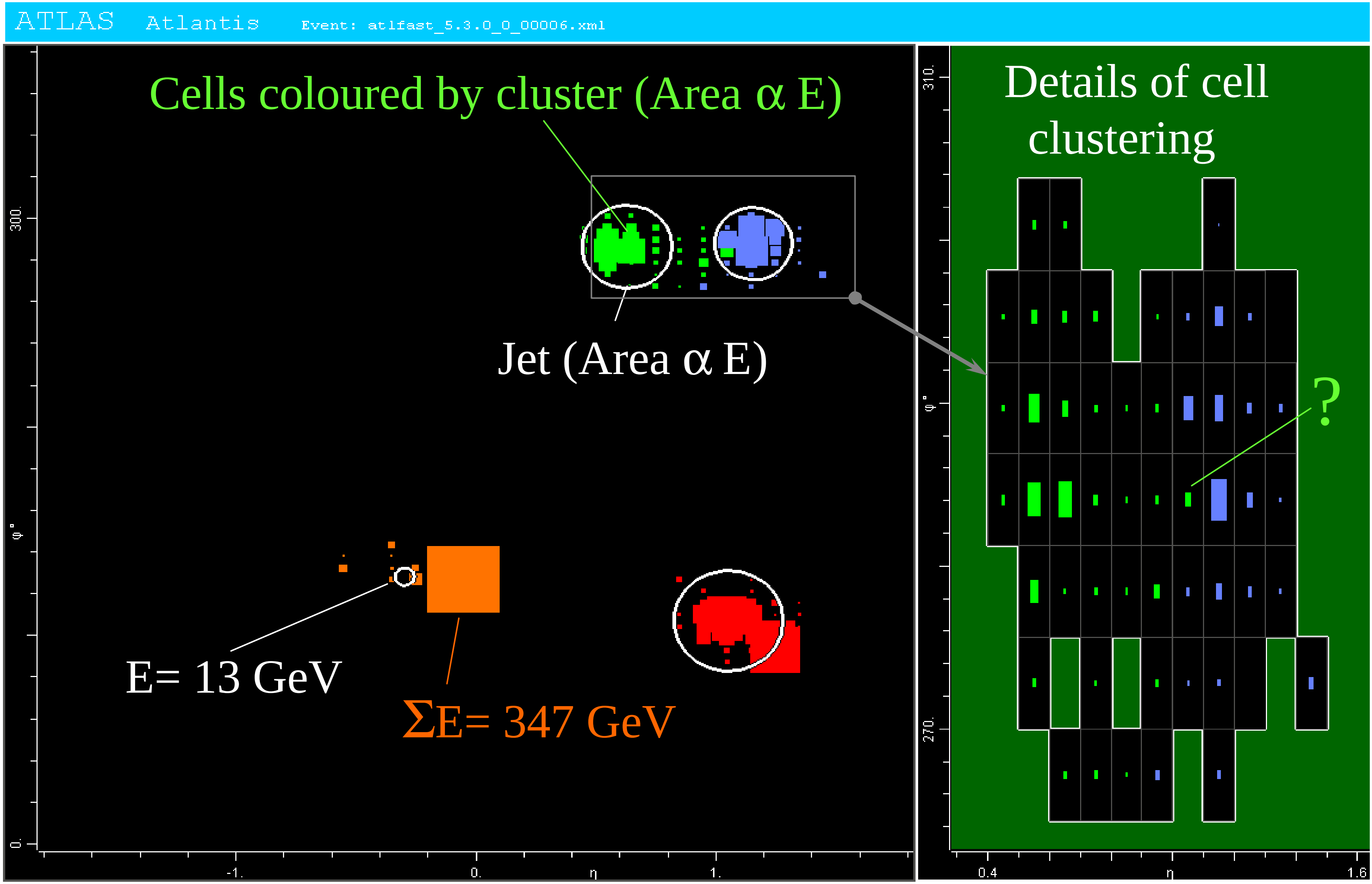
```
use JiveXML JiveXML-* graphics
```

- Add to end of jobOptions.txt

```
ApplicationMgr.DLLs += { “JiveXML” };
ApplicationMgr.TopAlg +=
   {“JiveXML::Atlfast2XML/Atlfast2XML”};
Atlfast2XML.FileNamePrefix = “myEvents”
```

- Read output XML files with Atlantis

Cell clustering and Jet reconstruction – Atlfast (DC1- QCD event)



Cells coloured by cluster (Area α E)

Jet (Area α E)

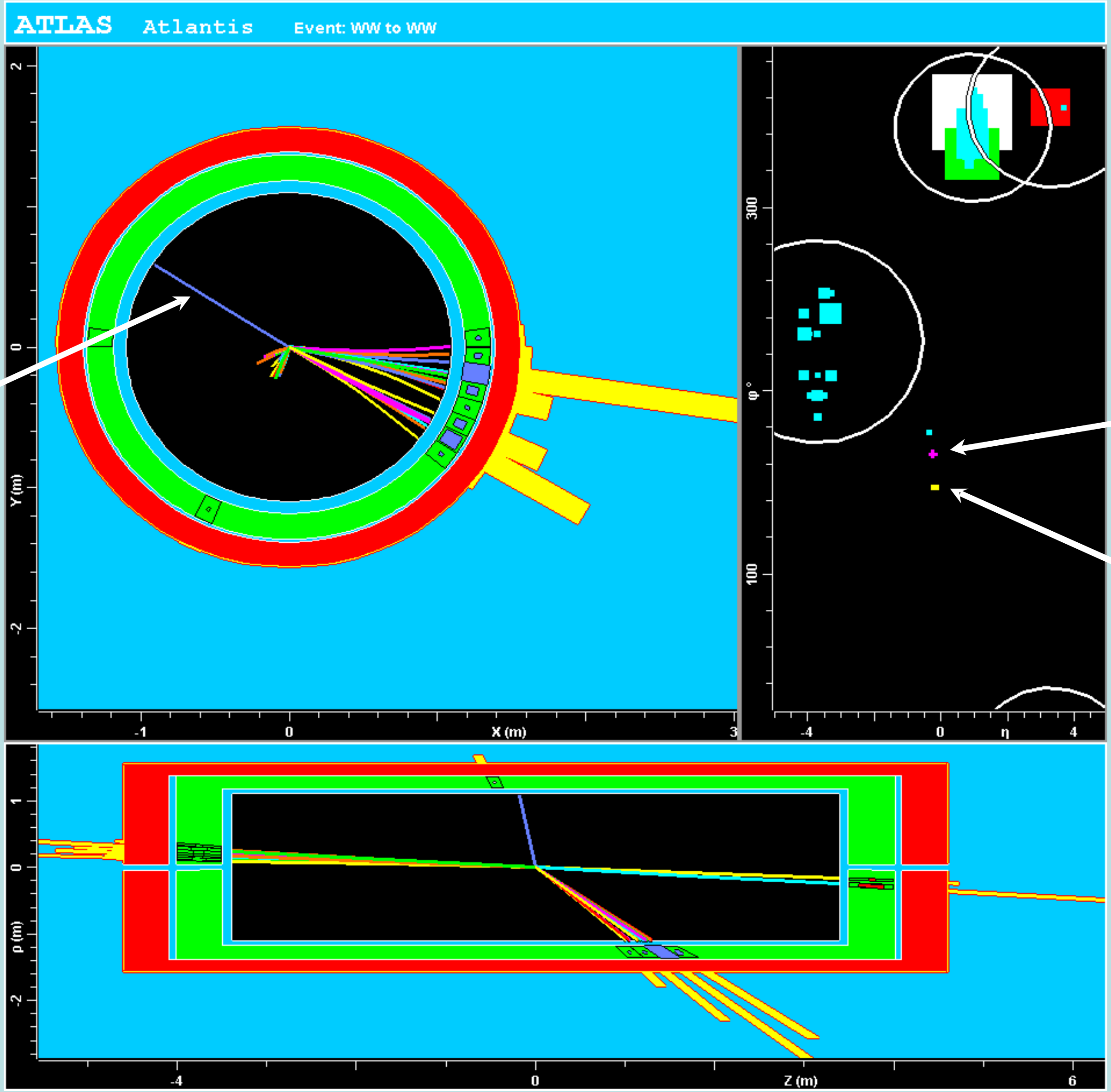
E= 13 GeV

ΣE= 347 GeV

Details of cell clustering

?

WW Scattering Event



muon

neutrino

muon