ATLAS Z path preparation/improvements for 2012
University of Oslo

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03 November 2011

Overview

- Web page
- Plotting tool
- Data sample
- HYPATIA

2011 procedure (recap from April meeting)

Students

1. Analyse 50 Z mumu ee events in HYPATIA, and combine objects in HYPATIA for inv mass calc
2. Enter invariant mass in an excel sheet
3. Upload results to google docs or deliver results manually to institute responsible

Institute responsible

4. Pick up students results either from google-docs or from memory-stick
5. Institute combined students results in a semi-automatic combination excel sheet
6. Take snapshot of result, extraction of mass, width 3.
7. Upload of combined results to moderators for videoconference

Video conference

8. J//Ψ and Z results had to be combined in one presentation for moderators

Obviously way too many steps

Requirements for new plotting tool - Z path

Required

- General
  - Tempting interface for students
  - Easy saving/upload of histogram
  - Reduce needed steps from student entry to video conference discussion of results
    - Reduce/simplify combination tasks for institute responsibles
    - Remove all need for videoconference moderators to treat the results
- Technical
  - Reliable system (like for instance server)
  - Scalable tool (how will server respond to many requests at the same time?)
  - Mirror sites, to both automatic copy files from one site to a mirror site, but also to distribute load onto several sites/servers
  - If upload possibilities, need sequre upload
  - No installation needs

Oslo plotting tool

`http://folk.uio.no/maikenp/masterclass/index.php`

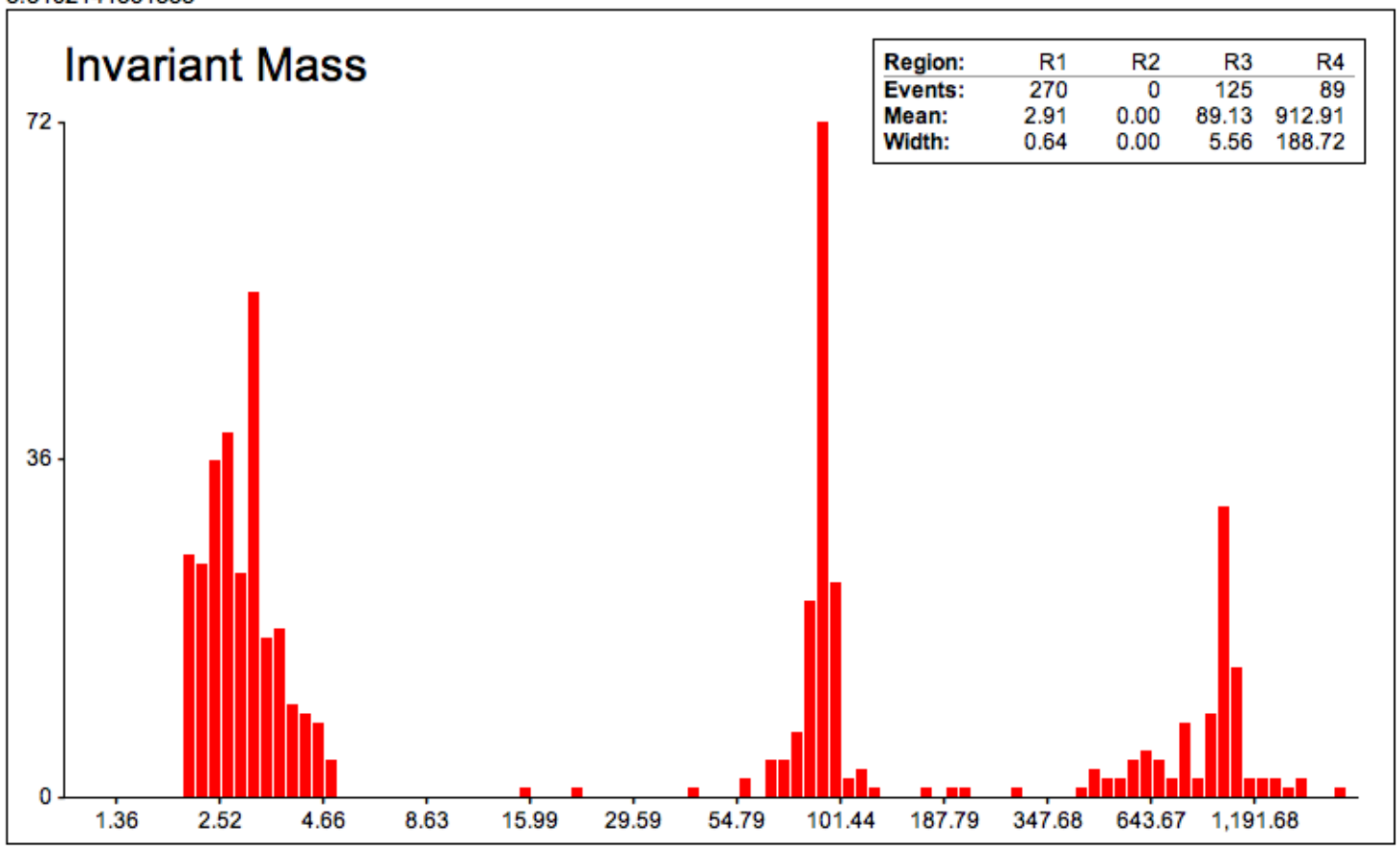
MasterClass – Combination for Oslo

♦ Index Page

Data:
One entry per line

2.01
2.01
2.01
2.02
2.02
2.03
2.05
2.06
2.07
2.07
2.08
2.08
2.08
2.09
2.10
2.10
2.10
2.11
2.11
2.12
2.12
2.12
2.13
2.13
2.14
2.15
2.16
2.17
2.19
2.20

3.3102141561553



Bins: 100 **X-Axis:** Logarithmic Refresh/Save

R1 Min: 0.0 **R2 Min:** 5.0 **R3 Min:** 70.0 **R4 Min:** 500.0
R1 Max: 5.0 **R2 Max:** 10.0 **R3 Max:** 100.0 **R4 Max:** 1500.0

Oslo plotting tool

Features in the Oslo tool that meet the requirements on previous page

- Steps in process reduced from 7 to 1. Only the students entry of values (invariant masses) is required.
- Possibility for students to tweak histogram
- Possibility to combine cross-institute results
- Possibility to combine ATLAS, CMS results in a seamless and straightforward way
- php-based, you just enter a web-page

Tools entry points

- For students (possibility to select, date, institute, group)
- For institutes (possitiblity to select date, institute)
- For video conference (possibility to select date)
- For administrator

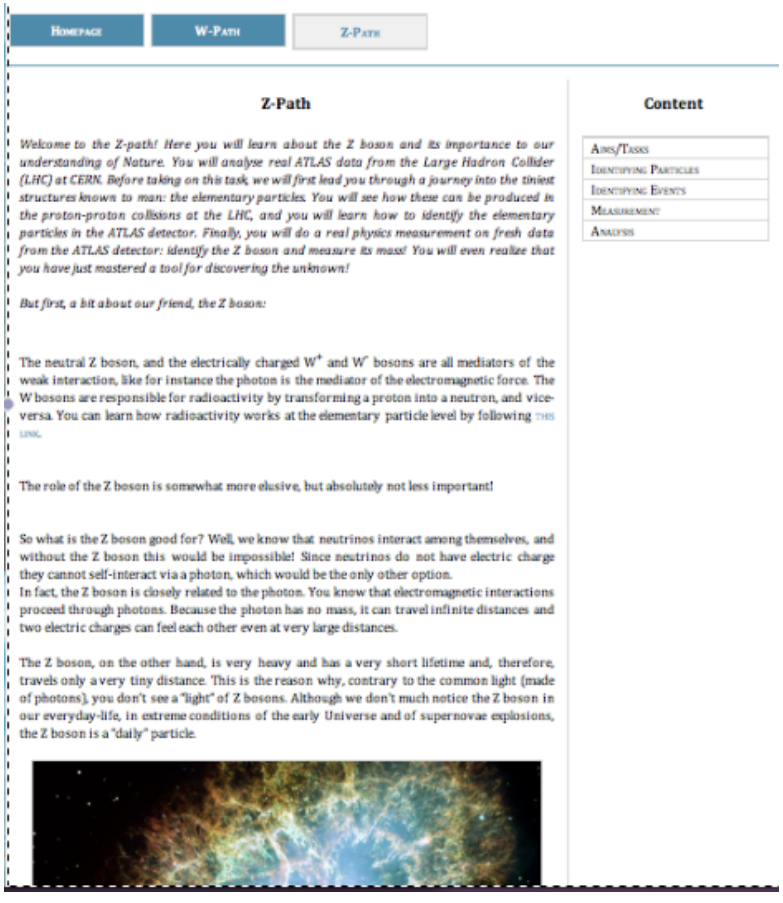
Zpath webpage modifications

Work has gone into tidying up the Zpath webpage.

- Shuffled pages (for instance opening page)
- Menus in 2011 version had some logic problems
- Some pages were too long/ too much text, could be split up
- Added chapter about New physics and the use of MC simulation

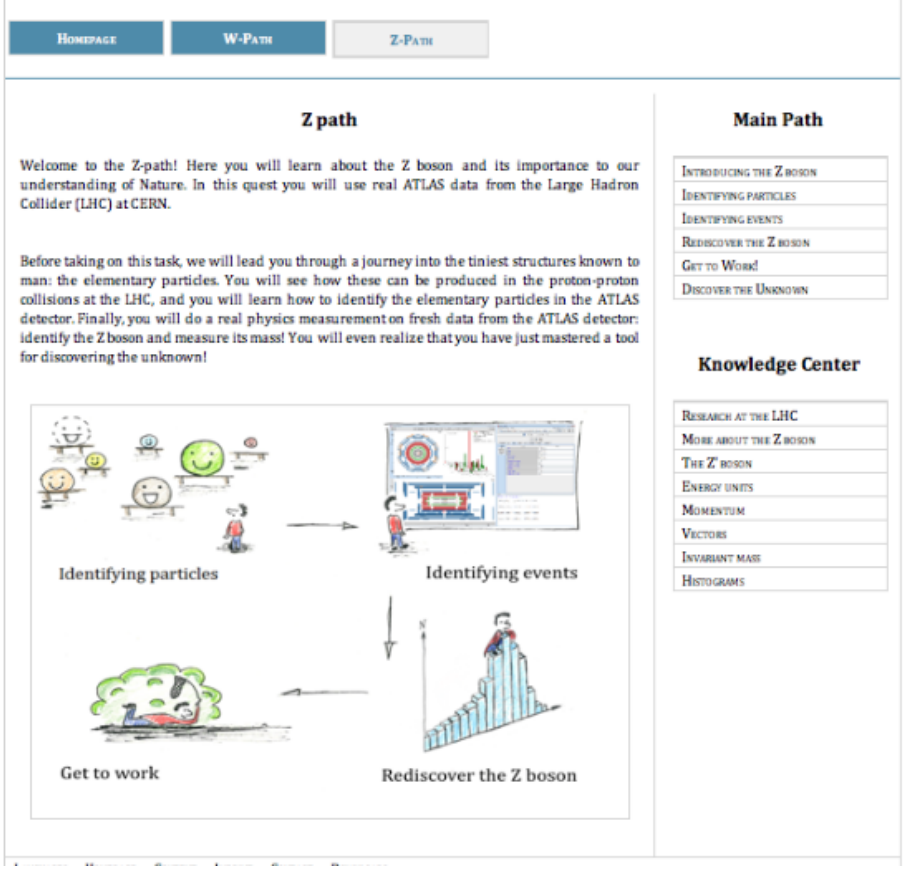
Zpath opening page

Old opening page



Too much text for an opening page! Now moved into the menu instead

New opening page



Natural opening page was the earlier Aims and Task page.

Zpath menus

Old menu

Content

- Aims/Tasks
- Identifying Particles
- Identifying Events
- Measurement
- Analysis

New menu

Main Path

- Introducing the Z boson
- Identifying particles
- Identifying events
- Rediscover the Z boson
- Get to Work!
- Discover the Unknown

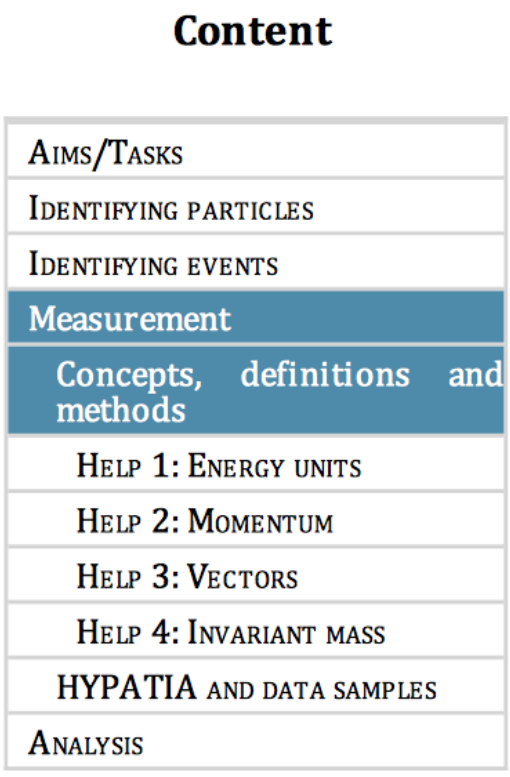
Knowledge Center

- Research at the LHC
- More about the Z boson
- The Z' boson
- Energy units
- Momentum
- Vectors
- Invariant mass
- Histograms

Some submenu items were not very logical. Menu-structure tidied up.

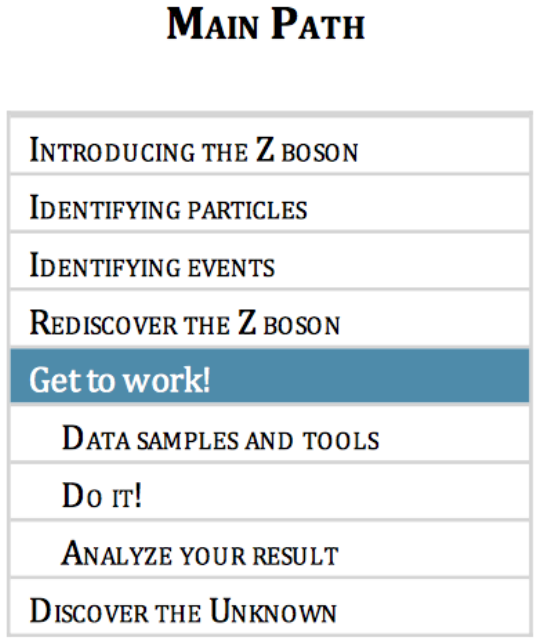
Zpath sub-menus

Old menu



Measurement sub-menu was basically including lots of item which really belonged elsewhere

New menu



Now Measurement sub-menu corresponds to the Get to Work! item in the opening page, and contains only items relevant to exactly the measurement

Data sample

- Larger datasampel compared to 2011 event
- More relevant background events
  - J/Ψ Υ, in addition to some W and dijet events
  - Will make the student selection of Z events maybe more interesting/challenging

HYPATIA - in the future

- In work to streamline tools could be good if HYPATIA (/MINERVA) has option to save track-list in other formats. For instance JSON which iSpy uses.
- This could allow a more developed histogramming tool to plot lot's of nice distributions, momentum, missing energy, invariant mass etc etc. just be the output from HYPATIA.