Implementation of analysis tracks in the ZEUS event display

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Monika:

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Meiert:

Production and analysis of beauty in ZEUS Secondary analysis of beauty Conclusions



The ZEUS detector



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ZeVis-ZEUS Event Visualisation

₩ ZeVis@zenith219 - 3 X <u>File Edit View Server Cotion FOUW</u> ⊒∈ p Request Event from Server | Download File from Server | Local File | Online Mode Q, Events Event Options Depoter Option. ¿ Zeus Run 47068 Event 4587. 6-01-2004 time: 22:06:16 date: E,-3.47 GoV E -13.1 GeV E.-2.64 GpV Previous Event 🔺 💌 Nevi Event E-pz=47.9 GeV E=29.6 GeV p.=-8.52 GeV E,=24.5 GeV p.=8.66 GeV p.=1.53 GeV p,=-18.3 GeV t_=1.35 ns | L=-0.779 ne phi=-1.39 t.=-2.11 ns t.=-0.716 ne 🗋 Əiri 17015 -↓ = 1.22 x__=0.01 E.=24.5 GeV 0.=2.70 Prob.=0.939 🙀 Event 3101 y____-0.10 ...=137.4 GeV O, 🔄 Əlir 17020. Zocio - 🚰 Event 1478. Factor 🔄 Əlir (2023) THU8 🚰 Event 1088. 🔄 Əliri 17033 i 🚰 Event 14. -] Ə.r. 17038. . -Event 4587 -🗋 Ələr (2021) 💊 Event 4285. 📴 Event 5422. 🗍 Əliri 17073 i 🙀 Event 15185. . 🔄 Əlir (17074) 👾 🌌 Event 1442. XY View **ZP**: View . 1 🛅 Ə.r. 17078. 0101 7645_10.#1-74, #1-28 Sun 47083 Evo 1 4587.

MVD = Silicon Microvertex Detector



What are analysis tracks?

Example: charm production



The new menu options for tracksOld display:New display:



The new menu option for vertices Old display: New display:

✓ ZeVic@zenith238 👻 ZeVis@ cenitb2 Die Dat 2000 Genrer Option DOTW Sarwir Satur FOTA 20 211 HWD Central General Hands Everts Se. Handa date: 12-03-2005 time: 22:29:55 /=11.4 GeV E_=5.13 GeV Events Ra 4-01-2004 time: 21:31:17 Zeus Run 53586 Event 19236 Zeus Run 47015 Event 3101 Generative President 1 E. =10.7 GeV E-p_=40.4 GeV E,#11.4 GeV #39.3 GeV Genetry 9 E-N30-W E-a-SES Gen E.-141 GeV E, HIT GeV EF180 OVY MAD P. 40.295 Gev **FTW/QUI I** p=0.578 GeV p.=-0.497 GeV P. =-10.2 GeV p,=-3.88-Cev 3/hors/5004 EAL OWN P.P.4.73 GeV p. n.d. for Carl e.ethi Dev Columneter. 00 1.02 ns 1.=-1.7 ns. 1 7-1.21 86 Sec. 00 1+2.61 1,=-1.21 ns traiting. 0.864 m 1-100 mm 1,=-0.00071 mm - Devi p81=4.75 E,=38.6 GeV Res 47015 1280 -2.97 51100-12.72 Gev 500 -22.7 GeV Coorinette Prob. 084 =0.999 6,-178 4.4.78 Prob. +6 008 - Dert Much Charless 2 Real +INT Cal Stead FORT na 47000 Zecr and a Mart Chambert DAG - 10ml **SCIO** -Silbert PDE1 **Event** 2889 na 47023 Ded **BAC** Tracks. - Dark Rent Muon Tracita Event Contract Contract Pen 67.03 C.GL. Hitt Elbert lew Tracks - Dent CTD Hilk - Dead FMUCH Tracks Muon Hits 744 67 81 STIHE CALINE and Parent **ETD HIS** CTD Hits 1 fun 4202 f MyDildz. Muss Ho - Devel RAC HIS STT Hb - Dont Vinters VCTVTX Verlices (CTD and FTD HIS **3D View Option** ZTVTX Vedues (MVD) Bas 42022 MUD HIS · Dard Move Opages Primary Verlax Brox Billore RAC Ha 10a 42034 Secondary Vertex. Volks. (CTVTH Wetters (CTD only) + Viorn-Ib 330 II. Yes Securitory Vertex Error Ellipse Vavradh CeanGL 30 View Option ZTVTX Vertices (MVD+CTD) + Primary Verlag Forvierd Triebs-Phil GIVEN Werkeys runn Mone Operation Printery Verley, Error Ellipse Res STREET BAS Ba-Phi Energy Olisito 244a Vast 1+374,531aa, y+521.000m Secondary Veter EvontTro Special 1 Securities Verlax Error Ellips Eves NUMW 120 cent link genGL of These Phil VCTVTX Vertices (CTD only) Vertex ZTVTX Vertices (MVD+CTD) Primary Vertex -> (MVD+CTD) ZTANA Vertices Primary Vertex Error Ellipse GTVTX Vertices (GTT) Secondary Vertex Secondary Vertex Error Ellipse

A relative easy **example**:

Adding the menu options of the primary analysis tracks to the GUI

The menu options are done in ZClient #ifndef ZEVIS_EZMenuViewOption #define

In ZClient.h the enumeration EZMenuOption has to be completed:

```
#Inder 2E VIS_EZMend ViewOption
#define
ZEVIS_EZMenuViewOption
Enum EZMenuViewOption {
...
kM_Tracks_ANA_Pri,
...
}
#endif
```

Adding the menu options of the primary analysis tracks to the GUI

In ZClient.cxx:

Menubar has to be created:

```
void ZClient::CreateMenuBar() {
...
fMenuViewOptionTracks->AddEntry("&CTD primary vertex
    tracks (ZTANAPRM)", kM_Tracks_ANA_Pri);
...
}
```

Entry has to be checked and unchecked alternately when clicked at:

```
void ZClient::UpdateStatus() {
...
if (view->GetVisTracksANAPri() )
fMenuViewOptionTracksVF->CheckEntry(kM_Tracks_ANA_Pri);
else
fMenuViewOptionTracksVF->UnCheckEntry(kM_Tracks_ANA_Pri);
...
}
```

Adding the menu options of the primary analysis tracks to the GUI

In ZClient.cxx:

Menubar has to be created:

```
void ZClient::HandleViewOptionMenu(Int_t id) {
...
case kM_Tracks_ANA_Pri:
    if (fMenuViewOptionTracksVF->Is EntryChecked(kM_Tracks_ANA_Pri) ) {
      fMenuViewOptionTracksVF->UnCheckEntry(kM_Tracks_ANA_Pri);
      view->SetVisTracksANAPri(0);
    } else {
      fMenuViewOptionTracksVF->CheckEntry(kM_Tracks_ANA_Pri);
      view->SetVisTracksANAPri(1);
...
    }
Break,
...
}
```

Addition and filling of new track/vertex structures

The first revertexed events I displayed



Event from D⁺ preliminary result 2006 [1]

The first revertexed events I displayedD+-candidate $c\tau(D+) = 305 \pm 26 \pm 14 \ \mu m$

Old display:

With analysis tracks:



Run 53586 event 19236

The first revertexed events I displayed D⁺-candidate $c\tau(D+) = 305 \pm 26 \pm 14 \mu m$

Old display:

With analysis tracks:



Run 53921 event 24433

Conclusions

Task to facilitate the data analysis by adding the analysis tracks to ZeVis is fulfilled Secondary vertices can be nicely seen New defined classes can be used to fill in other kind of refitted data

There is still some room to improve the userfriendliness of ZeVis

The possibility to make simultaneous ticks in the user menu would be highly preferable Problems with vertex buttons

etc.

Production and analysis of beauty in ZEUS

HERA and ZEUS offer opportunity to investigate heavy flavour quarks

Cross section for production very small, so all decay modes are important

Tagging for hadronic decay modes introduced and used for analysis by Ana G. Yagues

Goals:

Check results of primary analysis (decay length and invariant mass)

Check transfer of analysis from "private" environment to standard ZEUS analysis framework

Comparison of control plots

Results:

Some problems with transfer to standard environment Nevertheless, rough agreement with physics from primary analysis



Primary analysis

Secondary analysis

Results

Rough agreement in characteristic properties of heavy flavor mesons: invariant mass ...



... and decay length



Conclusions

ntuple production does not work properly the physics seems to agree Hope that data get better with: better flags (ntuple) better implementation of cuts (ntuple) better statistics/event selection

The End

Thank you for your attention!

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