



CEPC Jet&Clusters

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- Samples
- Vertex
- TDR

CEPC sample/release



- Latest master release.
 - Need 6GB memory, speed slower.
- H->qq, Z->qq, WW/ZZ->4q sample available under
 - /cefs/higgs/zhangkl/Production/2412/
 - /cefs/higgs/guofy/CEPCSW_tdr24.12.1/performance/JER_eeqq
 - New PID, vertex fit in latest: /cefs/higgs/zhangkl/Production/24122
- Other processes and generators under study @Nazima

```
192.168.50.114@tcp:/cefs      3.7P  3.2P  356T  91% /cefs
```

- Limited /cefs disk quota. 800T->356T available.

MCParticle Parent/Daughter Pointer

- Bug: MCParticle container will lose pointer relationship in copy.
 - MCParticle-> getDaughters(0)->getPDG()
 - Essential for mc topology.
 - If “keep *” all the time, no this issue.
 - Reported to software group.

```

JetOrigin      INFO id: 620d5704
PDG : 25
generatorStatus : 2
simulatorStatus : 0
charge : 0
time : 0
mass : 125
vertex : 0 0 0
endpoint : 0 0 0
momentum : -21.8565 21.5034 -27.6322
momentumAtEndpoint : 0 0 0
spin : 0 0 0
colorFlow : 0 0
parents :
daughters : ffffffff-1
  
```

```

id: 620d57088
PDG : -14
generatorStatus : 0
simulatorStatus : 1073741824
charge : 0
time : 6.46358
mass : 0
vertex : -1160.4 68.2995 -1437.91
endpoint : -6312.01 -4567.78 -10000
momentum : -0.192624 -0.173348 -0.320146
momentumAtEndpoint : -0.192624 -0.173348 -0.320146
spin : 0 0 0
colorFlow : 0 0
parents : 620d57041
daughters :

id: 620d57089
PDG : 13
generatorStatus : 0
simulatorStatus : 1073741824
charge : -1
time : 6.46358
mass : 105.658
vertex : -1160.4 68.2995 -1437.91
endpoint : -422.527 -646.651 -3417.13
momentum : -0.406967 -0.317798 -0.551624
momentumAtEndpoint : -0 -0 0
spin : 0 0 0
colorFlow : 0 0
parents : 620d57041
daughters :
  
```

Sample Requirement for TDR note

No endcap;

Ecal 10*10mm.

Also we assume there are no big change in detector level.

Following samples are almost ready.

For ttbar, Vcs/Vcb, LLP, weak mixing angle, need analyzer to participate.

	Process @ c.m.e	Domain	Relevant Det. Performance
Z→μμ	Z@ 91.2 GeV	Z	lepton ID, tracking
H→γγ	qqH	Higgs	photon ID, EM resolution
Higgs recoil	ℓℓH	Higgs	Lepton ID, track dP/P
H→ss	vvH @ 240 GeV	Higgs	PID, Vertexing, PFA + JOI
H→inv	qqH	Higgs/NP	PFA, MET
Vcs/Vcb	WW→ℓvqq @ 240/160 GeV	Flavor	PFA, JOI + PID (lepton, tau)
H→LLP	ℓℓH	NP	TPC, TOF, calo, muon detectors
↕			
H→μμ	qqH	Higgs	lepton ID, tracking, OTK
Top mass & width	Threshold scan @ 360 GeV	EW	Beam energy
Weak mixing angle	Z→bb @ 91.2 GeV	EW	JOI

Signal Process	Sample Stats	Bkg Process	Stats
Z->mm@91.2GeV	100k	ee->mm@91.2	In barrel nearly bkg free.
H->yy Z->qq	100k	ee->qqy, ee->WW/ZZ->qqy	
Z->ll, Hrecoil	100k	ee->WW/ZZ->ll+qq	
Z->vv, H->ss	100k	ee->(WW/ZZ)->qq	
Z->qq, H->invisible	100k	ee->(WW/ZZ)->qq	
Z->qq, H->mm	100k	ee->(WW/ZZ)->ll+qq	

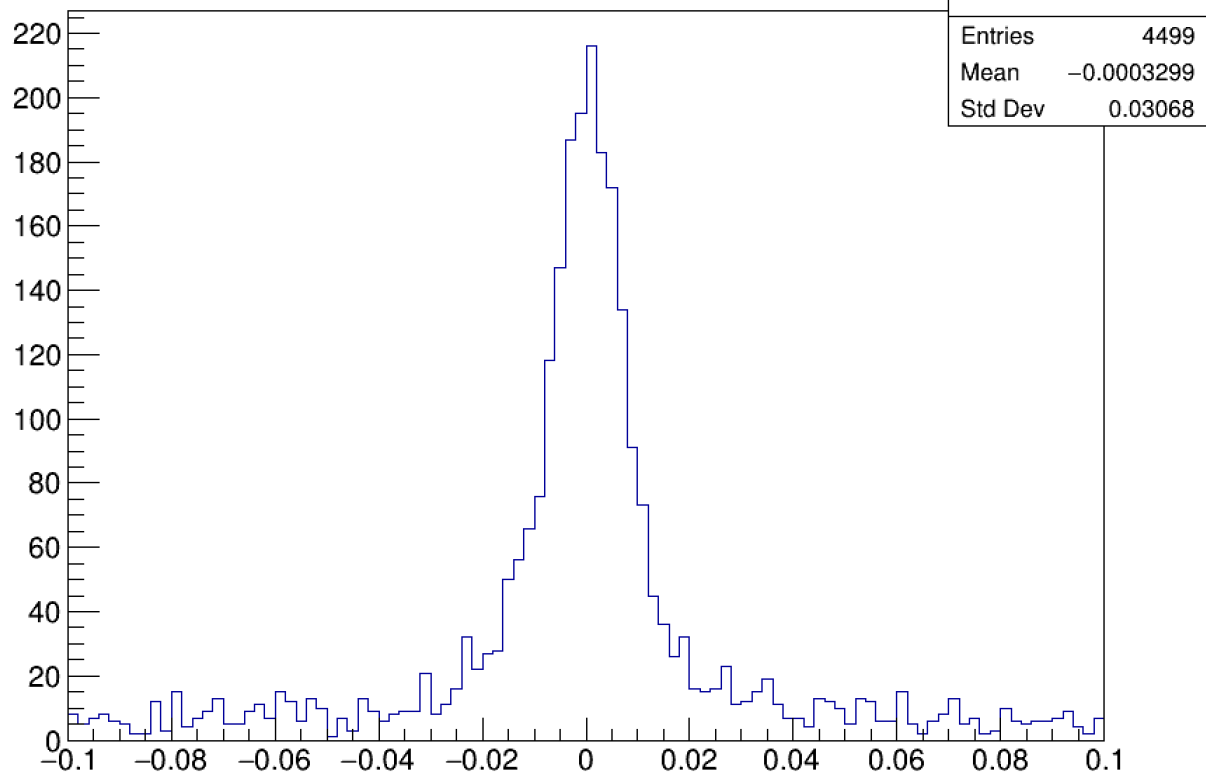
Generally, for bkg, need 240GeV, ee->qq(y); ee->WW/ZZ->(qq)qq; ee->WW/ZZ->ll(same flavor)+qq.

D0, Z0 without vertex fit

ZH→vvbb, 200 events. For PFOs with tracks and truth matched.
 Unit: mm; 0.1mm=100um. Vertex baseline position resolution: 3um.

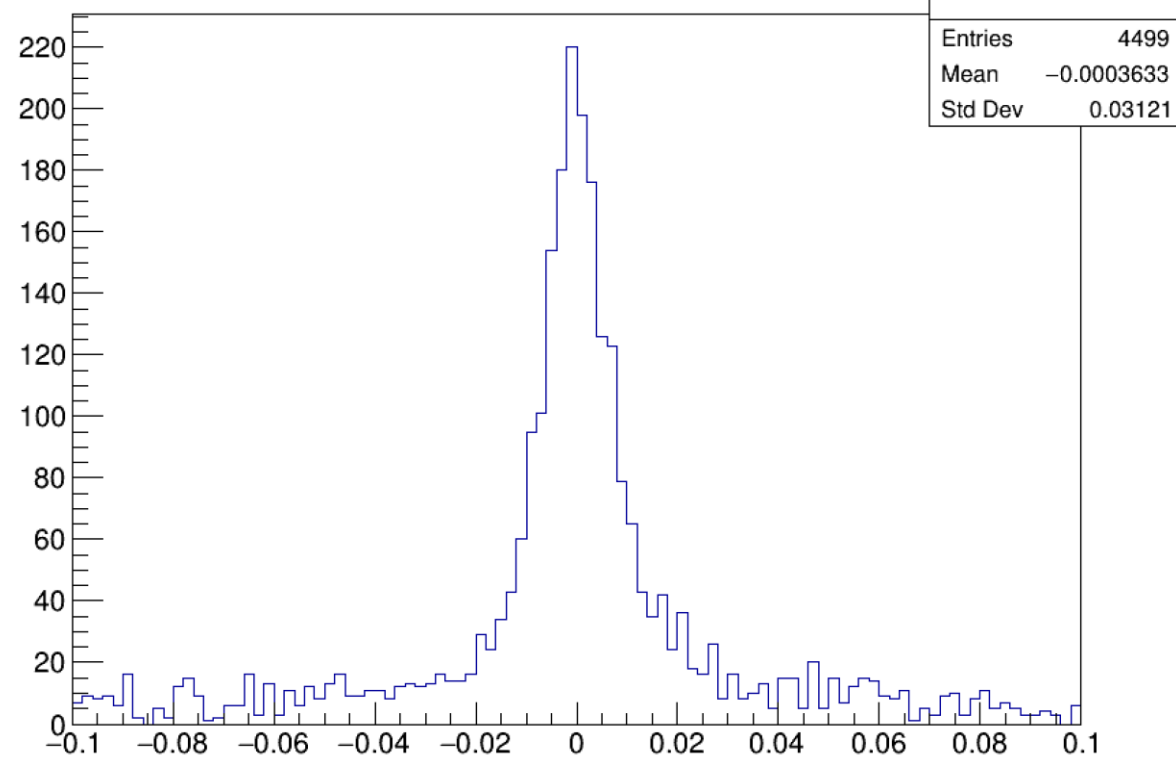
After fix, now d0, z0 value can be read correctly.

part_d0val {part_type==1}



Current PFO is able to get d0/z0 out of IP. Can be very far. Even to ~1.2m.

part_z0val {part_type==1}



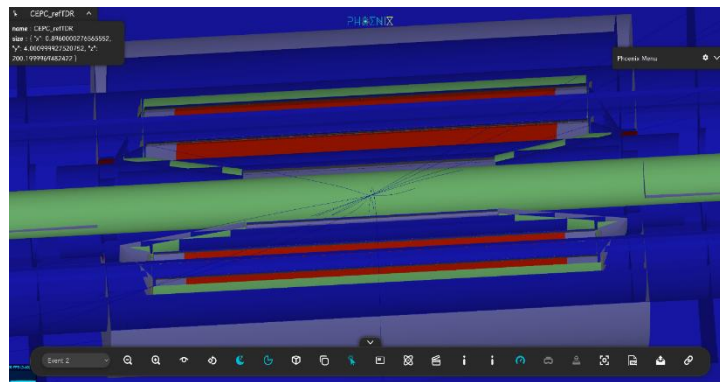
Will further check with ChenGuang with Vertex fit.

Chapter 1	Detector and Physics performance	1
1.1	Introduction	1
1.2	Detector Performance	1
1.2.1	Tracking (Chenguang Zhang, Hao Zhu, et al.)	1
1.2.1.1	Tracking efficiency	1
1.2.1.2	Momentum resolution	2
1.2.1.3	Impact parameter resolution	3
1.2.2	PID	4
1.2.2.1	Photon, Electron and Muon (Ligang Xia, Danning Liu, et al.)	4
1.2.2.2	Charged Hadrons (Chenguang Zhang, Xiaotian Ma, et al.)	4
1.2.3	Jets (Kaili Zhang, Xiaotian Ma, Yingqi Hou, Chenguang Zhang, Jiarong Li, et al.)	6
1.2.3.1	Actual Jet Energy Resolution	7
1.2.3.2	Jet performance in physics events	7
1.2.4	Vertexing (Chenguang Zhang, et al.)	12
1.2.4.1	Vertex Efficiency	12
1.2.4.2	Vertex Resolution	12
1.2.5	Jet Flavor Tagging - traditional way (Chenguang Zhang, et al.)	12
1.2.6	Jet Origin ID (Manqi Ruan, Kaili Zhang, et al.)	12
1.3	Physics Benchmarks	13
1.3.1	Event Generation (Kaili Zhang, Gang Li, et al.)	13
1.3.1.1	Monte Carlo event generators	13
1.3.1.2	Generated signal and background samples	13
1.3.2	Analysis Tools	13
1.3.2.1	Multivariate analysis tools	13
1.3.3	Higgs mass and production cross-section through recoil mass (Mingshui Chen, et al.)	14
1.3.4	Branching ratios of the Higgs boson in hadronics final states (Yanping Huang, et al.)	14
1.3.5	$H \rightarrow \gamma\gamma$ (Yaquan Fang, et al.)	14
1.3.6	$H \rightarrow invisible$ (Mingshui Chen, et al.)	14
1.3.7	Weak mixing angle (Zhijun Liang, Bo Liu, et al.)	14
1.3.8	A channel in flavor physics (Shanzhen Chen, et al.)	14
1.3.9	top mass and width (Xiaohu Sun, et al.)	14
1.3.10	W fusion cross section (Hongbo Liao, et al.)	14
1.3.11	Long-lived particles (Liang Li, et al.)	14
1.3.12	smuon (Xuai Zhuang, et al.)	14
1.3.13	$Z \rightarrow \mu\mu$	14
1.3.14	$H \rightarrow \mu\mu$	14

Provide the post-calibration distribution?
Timescale;
Some channel can start (photon, muon)
Some still missing (endcap, MET)
Analysis tools (now PID available,
Still need isolated objects, vertex, flavor tagging.)

Event display

@Zeng Yujie, You Zhengyun



- [His slides](#)
- Version to use: <https://code.ihep.ac.cn/zhangkl/phoneix>
- Latest geometry applied;
- Enough for general purpose.

README.md

phoneix

CEPC Ref-TDR Event Display Tool. Maintained by Yujie Zeng, migration to code.ihep.ac.cn by Kaili

Phoneix: <https://github.com/HSF/phoneix>

Start with python: `python -m http.server 8080 --directory=phoenix-app-root-path`

Then get access Phoneix with: <http://localhost:8080>

Choose CEPC. And load CEPC ref-TDR geometry: CEPC_refTDR.root

Two jsons attached: tops_cld.edm4hep.json from Fcc. With VertexJets objects;
rec_E91_bb_00389.edm4hep.json from CEPC ee->vv+bb.

Further functions under developing.