CEPC Performance RefTDR meeting

Jets & Clusters

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CEPC sample/release

- Please use latest master release.
- Software team just provided latest 25.1.0 with Endcap included
- Currently verification getting done before starting mass sample generation
- Other processes and generators under study by Nazima

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

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

Endcap fixed: Software group promised it for this week and delivered ECal 10*10mm.

Assuming no big changes 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	ννH @ 240 GeV	Higgs	PID, Vertexing, PFA + JOI
H→inv	qqH	Higgs/NP	PFA, MET
Vcs/Vcb	WW→ℓνqq @ 240/160 GeV	Flavor	PFA + 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(γ); ee→WW/ZZ→(qq)qq; ee→WW/ZZ→ll(same flavor)+qq.

Re-calibration needed for distributions after new CEPCSW update (PID, Vertex Fit)

Timescale: Mid-February?

Some channels are starting (photon, muon)

Endcap being ready so better samples coming soon + increase in preliminaries results for BMR in barrel

Analysis tools (now PID available, Still need isolated objects, vertex, flavor tagging.)

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Event cleaning results consistent with CDR.
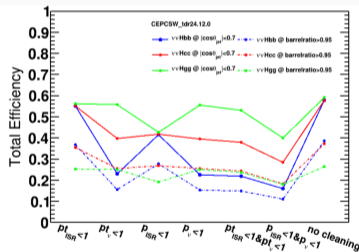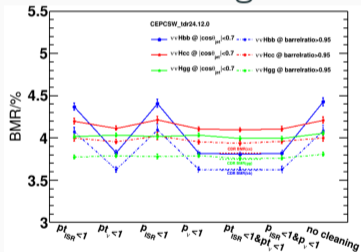
Efficiency cutflow/%	$ZH \to \nu\nu gg$	$ZH \to \nu\nu bb$	$ZH \to \nu\nu cc$
$\Sigma|Pt_{ISR}| < 1 GeV/c$	95.3	95.4	95.4
$\Sigma|Pt_{\nu}| < 1 GeV/c$	89.8	39.3	66.6
$|\cos\theta_{jet}| < 0.7$	53.1	22.0	38.0
BMR/%	3.99 ± 0.02	3.81 ± 0.03	4.10 ± 0.02
$|\cos\theta_{jet}^{truth}| < 0.7$	48.5	20.8	35.9
BMR/%	3.97 ± 0.02	3.76 ± 0.03	4.07 ± 0.02
barrelratio > 0.95	23.9	15.0	24.4
BMR/%	3.76 ± 0.02	3.62 ± 0.03	3.94 ± 0.03

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Event display (by Zeng Yujie & You Zhengyun)

- Slides
- Version to use: `https://code.ihep.ac.cn/zhangkl/phoneix`

phoneix

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

Phoneix: https://github.com/HSF/phoenix

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.
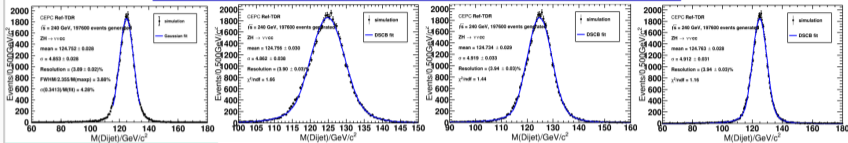
- Latest geometry applied;
- Enough for general purpose
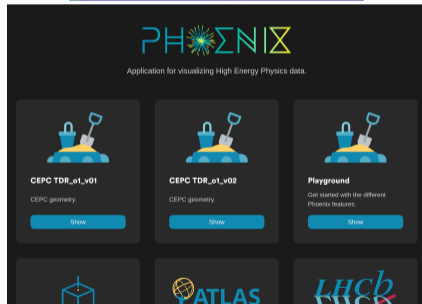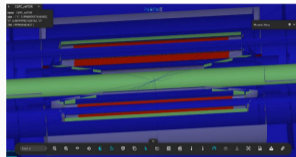
Interactive web app

Thank you!

Back-up

$ZH \rightarrow \nu\nu cc$ barrelratio > 0.95 With pt event cleaning

FWHM 0.5GeV/bin Unbinned Gaussian fit Count 68.26% region	Unbinned DSCB fit -> Shrink fit range Efficiency: 24.4%->24.3%->24.1%	Unbinned DSCB fit (now)

➢ Now BMR is **3.94%**

➢ **Shrink fit range**: lose **~1% event** to improve BMR improves to **3.90%**

➢ **Gaussian to fit peak**: BMR improves to **3.89%**

➢ **Binned FWHM**: BMR improves to **3.88%**

➢ **Count 68.26% region around fit mass point**: full region not gaussian, decreases to **4.28%**

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