



Progress of Pixelated readout TPC for CEPC TDR

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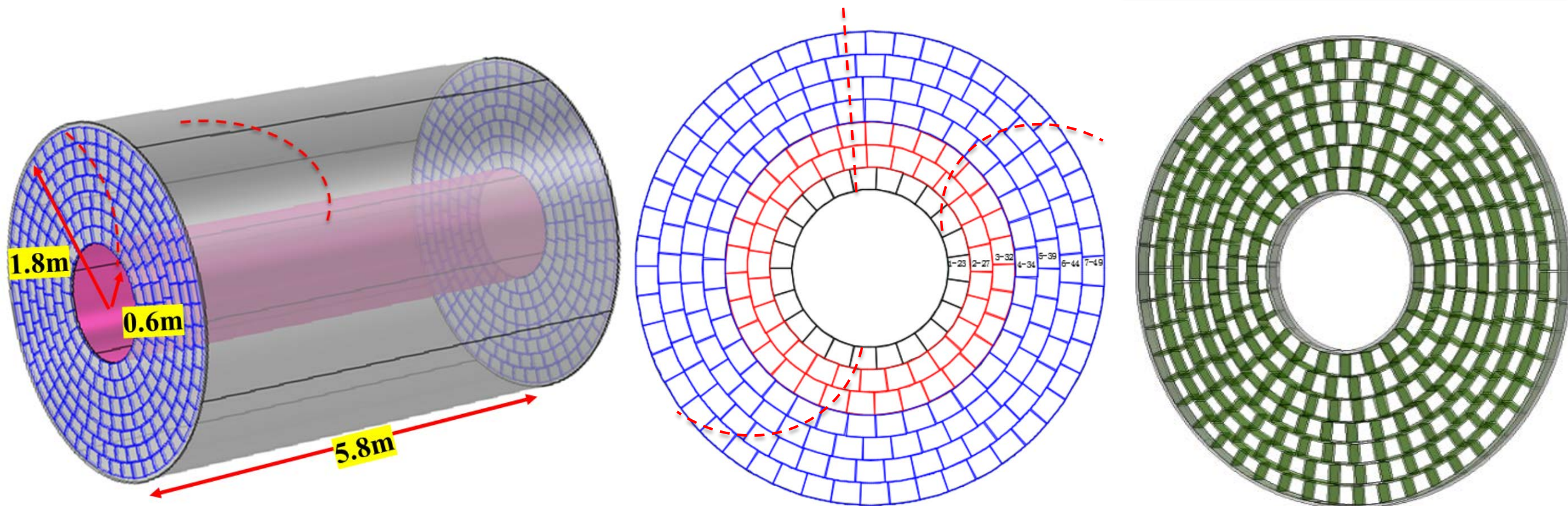
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Weekly meeting of CEPC Track Group, April 26, 2024

Easy-to-install modular design of TPC for TDR

- High granularity readout TPC can operate at Higgs run in **3.0T** and Tera-Z run in **2.0T**
- Easy-to-install modular design: optimized modules in the endcap
 - Coverage of the sensitivity readout area increased **to 96%**
 - **Full-scale modelling and FEA analysis on-going**

Report by Junsong Zhang



Optimization of Geometry of TPC detector and the Endplate

Cost estimation

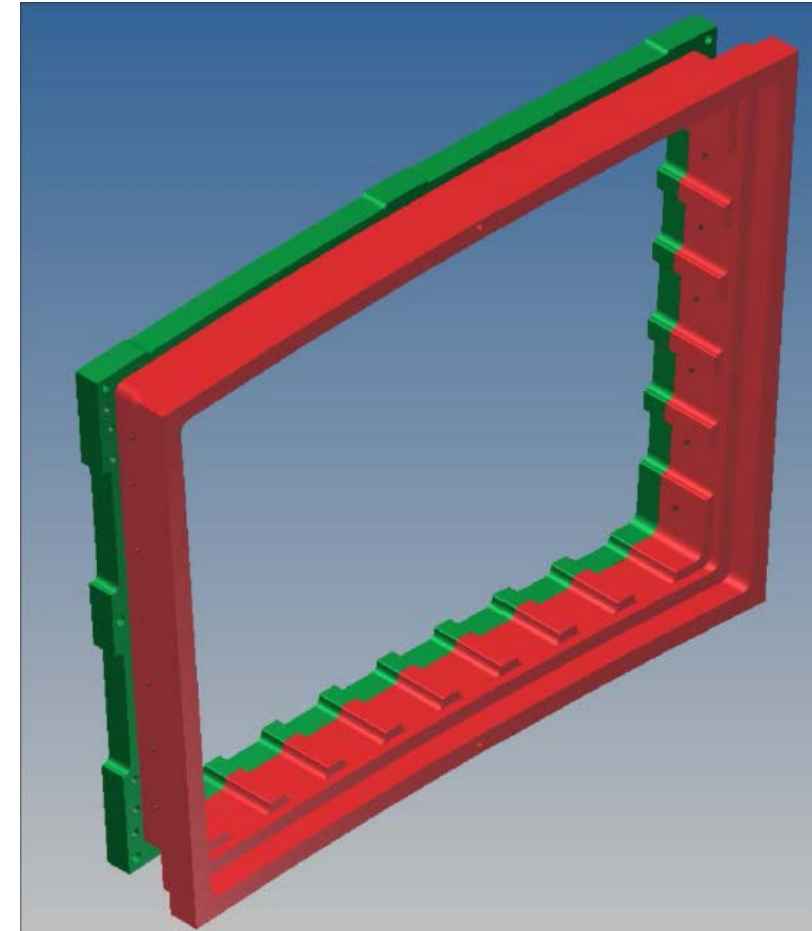
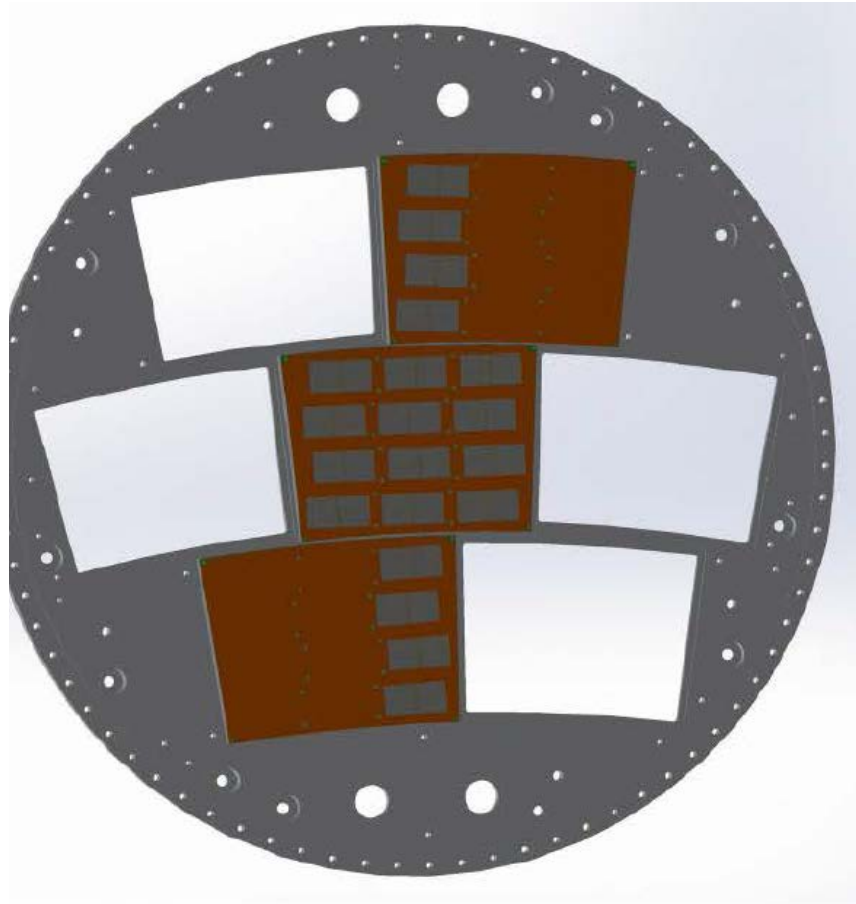
- Cost estimation: **~110 Million RMB**
(Detector 50 Million + Electronic/DAQ 60 Million)
- Full-size aluminum machining → Modular Machining

TPC COST ESTIMATION (Unit: *10K CNY)

Number		Detector concept/ Detector items	Unit	Unit cost (CNY)	Quantity	total cost (CNY)
		CEPC				
3.2		Time Projection Chamber				11000.00
	3.2.1	Chamber				1300.00
	3.2.1.1	Fieldcage (inner and outer)		400.00	1	400.00
	3.2.1.2	Barrel (inner and outer)		600.00	1	600.00
	3.2.1.3	Cathode and HV crate		200.00	1	200.00
	3.2.1.5	Support board		100.00	1	100.00
	3.2.2	Endplate				2000.00
	3.2.2.1	Aluminum endcap		400.00	2	800.00
	3.2.2.2	MPGD detector module		400.00	2	800.00
	3.2.2.3	Readout bef. Assembly		100.00	2	200.00
	3.2.2.4	pre/Assemnled board		100.00	2	200.00
	3.2.3	Electronics				6000.00
	3.2.3.1	FEE ASIC readout		0.010	200000	2000.00
	3.2.3.2	Cables		0.03	30000	900.00
	3.2.3.3	Optical link, connectors		1.00	300	300.00
	3.2.3.4	DAQ system		0.30	4000	1200.00
	3.2.3.5	Crate and controller		20.00	30	600.00
	3.2.3.6	TPC cooling system		1000.00	1	1000.00
	3.2.4	Alignment and calibration				500.00
	3.2.4.1	Calibration system		500.00	1	500.00
	3.2.5	HV and Gas system				1200.00
	3.2.5.1	HV and low power		400.00	1	400.00
	3.2.5.2	Gas system		300.00	1	300.00
	3.2.5.3	Slow control system		200.00	1	200.00
	3.2.5.4	Online monitoring system		200.00	1	200.00
	3.2.5.5	Testing bef. Assembly		100.00	1	100.00

Beam test at DESY in September

- Beam test planning and timeline have been discussed and finalized at IHEP.
 - Single Micromegas TPC module + one back-up module
 - Experimental measurements on Large Prototype TPC general beam test platform at DESY



Beam test at DESY in September

- Collaboration meetings of the beam test setup at Tsinghua.
 - Discussions with DESY are already underway as well.



DESY TEST BEAM

DESY 2 Test Beam Schedule 2024 – Status from 22/APR/2024

DESY 2 Test Beam Coordinators: Ralf Dierse, Norbert Meyers, Marcel Starobinski

Startdate	Week	TB21	T	TB22	T	TB241	T	TB24	T
01.01.2024	1	Shutdown		Shutdown		Shutdown		Shutdown	
08.01.2024	2	Shutdown		Shutdown		Shutdown		Shutdown	
15.01.2024	3	Shutdown		Shutdown		Shutdown		Shutdown	
22.01.2024	4	Shutdown		Shutdown		Shutdown		Shutdown	
29.01.2024	5	Startup		Startup		Startup		Startup	
05.02.2024	6	CMS Outer Tracker	X	dSPM	X			CMS-HCAL	X
12.02.2024	7	CMS Outer Tracker	X	MuSe	X			Aldimova-WP6	X
19.02.2024	8	CMS ETL ETROC	X	MuSe	X			Aldimova-WP6	X
26.02.2024	9	CMS ETL ETROC	X	TelePix	X			ATLAS HGTD	X
04.03.2024	10	ITk Pixel Dortmund	X	ATLAS-ITk-Strips	X			ATLAS HGTD	X
11.03.2024	11	CMS Inner Tracker	X	LHCb- MightyPix	X			CMS ETL	X
18.03.2024	12	CMS Inner Tracker	X	LHCb- MightyPix	X			SHP-SHADOWS-ECAL	X
25.03.2024	13	Maintenance		Maintenance		Maintenance		Maintenance	
01.04.2024	14	Maintenance		Maintenance		Maintenance		Maintenance	
08.04.2024	15	DESY Heidelberg TB School	X	Tangerhe	X			DESY Heidelberg TB School	X
15.04.2024	16	Schwartz-Feilman School	X	Tangerhe	X			ALICE-ITS3	X
22.04.2024	17	MD-2		RDSO-MPW4	X			CellVision	X
29.04.2024	18	CMS ETL ETROC	X	CMOS Strips Detectors	X			Telescope-Dev	X
06.05.2024	19	CMS ETL ETROC	X	CMOS Strips Detectors	X			IPHC-CE65_x2	X
13.05.2024	20	Maintenance		Maintenance		Maintenance		Maintenance	
20.05.2024	21	MD-2		dSPM	X			CMS HGCAL	X
27.05.2024	22	ATDRICH		Tangerhe	X			LHCb-ECAL	X
03.06.2024	23	CMS ETL ETROC	X	Tangerhe	X			LHCb-ECAL	X
10.06.2024	24	CMS ETL ETROC	X	Telescope-Dev	X				
17.06.2024	25	CMS ETL ETROC	X	DCRSD	X			CMS ETL	X
24.06.2024	26	CMS Inner Tracker	X	ATLAS-ITk-Strips	X				
01.07.2024	27	Maintenance		Maintenance		Maintenance		Maintenance	
08.07.2024	28	MONOPIX2	X					CMS-HCAL	X
15.07.2024	29	Belle-II CMOS	X					MIMOSIS	X
22.07.2024	30								
29.07.2024	31	BLAS proposition		TelePix	X			EIC AC-LGAD	X
05.08.2024	32	Shutdown		Shutdown		Shutdown		Shutdown	
12.08.2024	33	Shutdown		Shutdown		Shutdown		Shutdown	
19.08.2024	34	Shutdown		Shutdown		Shutdown		Shutdown	
26.08.2024	35								
02.09.2024	36								
09.09.2024	37								
16.09.2024	38								
23.09.2024	39								
30.09.2024	40								

Many thanks!