Welcome The Team of Institute of Physic, NASB to CEPC Detector and Physics R&D

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May 21, 2025

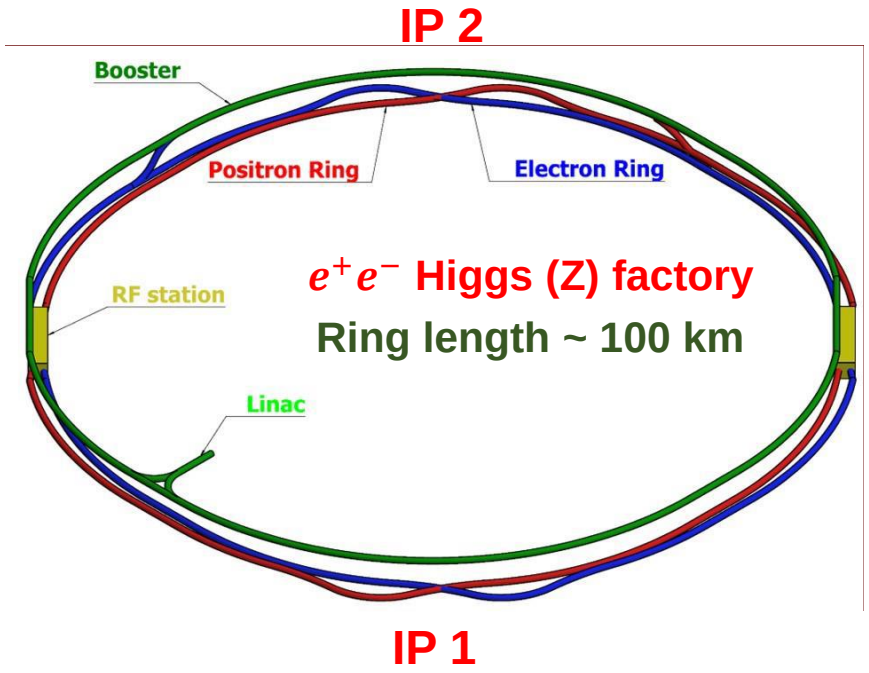
Participants

- Institute of Physics, NASB, Minsk (IP/NASB)
  - Dzmitry Shoukavy (COMET, CMD-3) Head of Laboratory of Particle Physics, IP/NASB
  - Darya Vasileuskaya (CMD-3) Data analysis
  - Aliaksei Paulau (COMET) R&D straw tracker
  - Siarhei Harkusha (ATLAS) TileCal software

- Institute of High Energy Physics, CAS, Beijing (IHEP/CAS)
  - Jianchun Wang (CEPC, LHCb, AMS) PhysDet co-convener
  - Gang Li (CEPC, BES) Analysis environment
  - Weidong Li (CEPC, BES, JUNO) Software team leader
  - Haoyu Shi (CEPC, HEPS) MDI team leader, background simulation
  - Fei Li (CEPC, BES, JUNO) TDAQ team leader
  - Boping Chen (CEPC) Trigger simulation
  - Zhijun Liang (CEPC, ATLAS) Vertex team leader, SiPM development
  - Yong Liu (CEPC, CALICE) ECAL team leader, SiPM application
  - Zhaoru Zhang (CEPC, ATLAS) Organizing

The Circular Electron Positron Collider (CEPC)

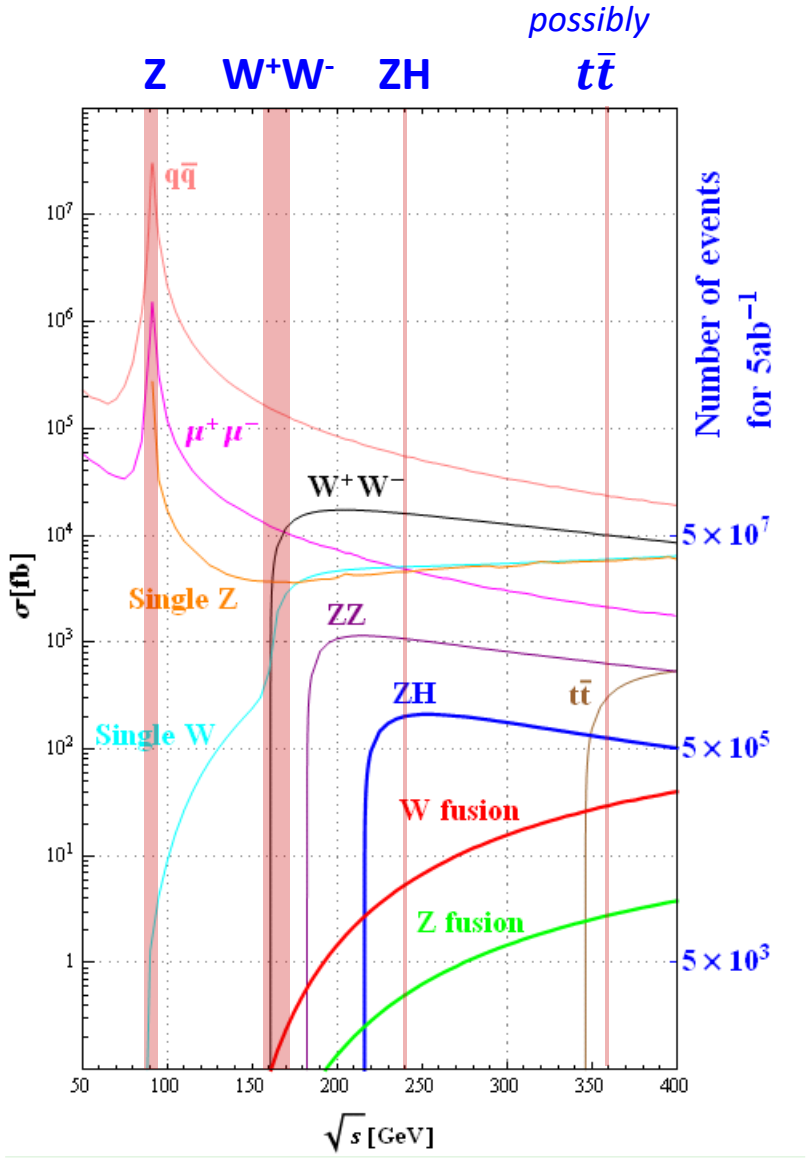
- The CEPC was proposed in 2012 right after the Higgs discovery. It aims to start operation in 2030s, as an e^+e^- Higgs / Z factory.
- To produce Higgs / W / Z / top for high precision Higgs, EW measurements, studies of flavor physics & QCD, and probes of physics BSM.
- It is possible to upgrade to a *pp* collider (SppC) of $\sqrt{s}$ ~ 100 TeV in the future.



Operation mode		ZH	Z	W^+W^-	$t\bar{t}$
$\sqrt{s}$ [GeV]		~240	~91.2	~160	~360
Run Time [years]		10	2	1	~5
30 MW	L / IP [$\times 10^{34}$ cm^{-2}s^{-1}]	**5.0**	**115**	**16**	**0.5**
50 MW	L / IP [$\times 10^{34}$ cm^{-2}s^{-1}]	**8.3**	**192**	**26.7**	**0.8**
	$\int L\,dt$ [ab^{-1}, 2 IPs]	21.6	100	6.9	1
	Event yields [2 IPs]	4.3×10^6	4.1×10^{12}	2.1×10^8	0.6×10^6

Both **50 MW** and $t\bar{t}$ modes are considered as upgrades

First 10-Year Operation



SR Power Per Beam	Luminosity/IP [$\times 10^{34}cm^{-2}s^{-1}$]		
	H	Z	W^+W^-
12.1 MW	-	26	-
30 MW	5.0	-	16
50 MW	8.3	-	26.7

B = 3T all modes

- **The first 10-year operation** includes: the Higgs mode, Low-Lumin Z mode, and W^+W^- mode.
- The accelerator may be upgraded for high lumi-Z mode and/or $t\bar{t}$ mode after 10 years operation, subject to physics needs
- The reference detector is only designed for the first 10 years operation. There may be future upgrade of the detector if the accelerator is to be upgraded

CEPC Reference Detector

3T Magnet
(SC Solenoid)

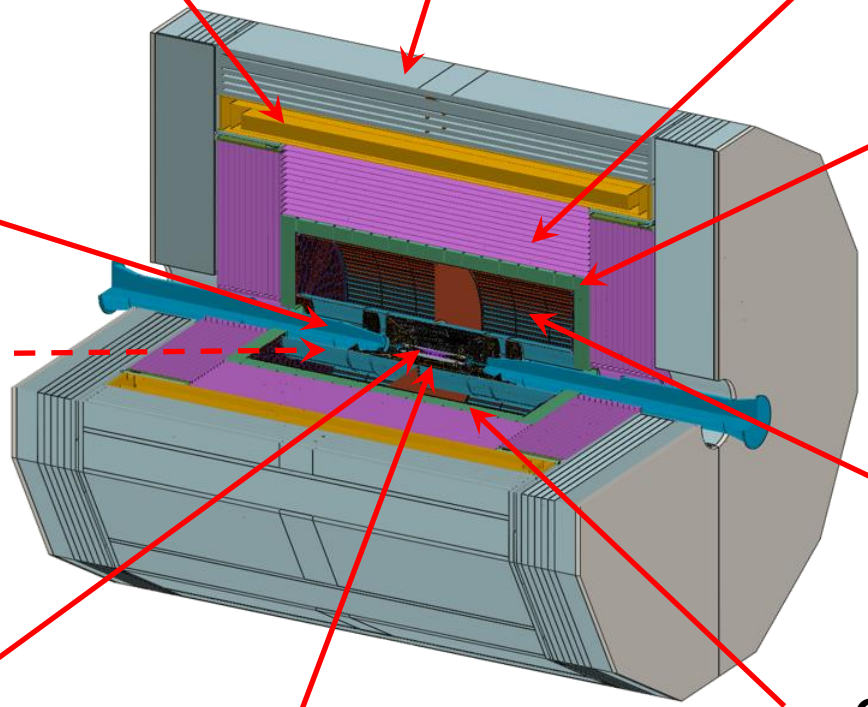
Yoke +
MU (PS+SiPM)

PFA HCAL
(Glass Scintillator)

Crystal **PFA ECAL**
(Transverse bar)

LumiCal
(SiDet + LYSO)

Potential
Endcap PID



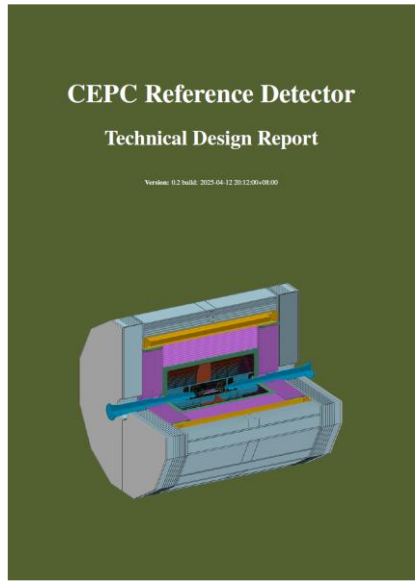
TPC
(Pixelated Micromegas)

VTX
(MAPS SiPixel
+ Stitching + Bending)

ITK
(MAPS SiPixel)

OTK
(AC-LGAD strip)

(Possible precision timing from the outer layer)



To be completed soon
Welcome authorship sign-up

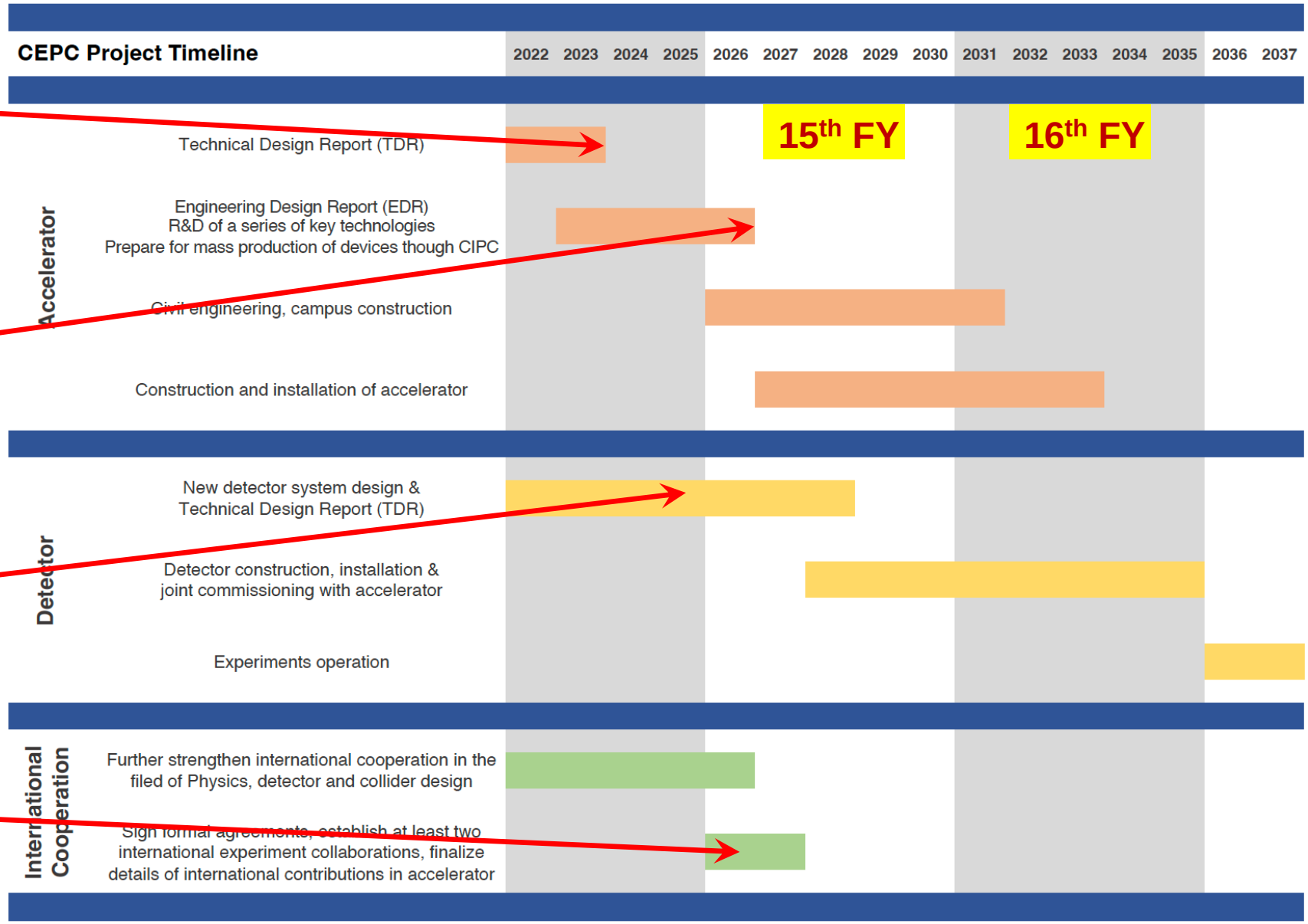
Ideal Timeline

Completion of Accelerator TDR

Completion of Accelerator EDR

TDR of a Ref-Detector @ June 30, 2025

International Collaborations



Useful Information

- CEPC webpage http://cepc.ihep.ac.cn/
- CEPC documents
  - CEPC Accelerator TDR: http://cepc.ihep.ac.cn/CEPC_tdr.pdf
  - CEPC CDR Volume I (Accelerator): http://cepc.ihep.ac.cn/CEPC_CDR_Vol1_Accelerator.pdf
  - CEPC CDR Volume II (Detector and Physics): http://cepc.ihep.ac.cn/CEPC_CDR_Vol2_Physics-Detector.pdf
- Major mailing lists:
  - CEPC-General cepc-general@maillist.ihep.ac.cn
  - CEPC-PhysDet cepc-physdet@maillist.ihep.ac.cn
- Regular meetings
  - The CEPC Day, https://indico.ihep.ac.cn/category/215/ monthly meeting announced via the CEPC-General mail list. It normally has 3 sessions: accelerator, physics/detector/software, steering committee.
  - The PhysDet plenary meeting, https://indico.ihep.ac.cn/category/324/ biweekly meeting announced via the CEPC-PhysDet mail list. It is arranged in the afternoon.
  - Subsystem meetings, organized weekly, in sub-category of https://indico.ihep.ac.cn/category/214/ and https://indico.ihep.ac.cn/category/1041/ Please let the leaders know to include in the mailing list.
- Workshops and conferences
  - The general ones are announced through the CEPC-General mail list. Topic specific workshops may be announced through different channels. They are normally in https://indico.ihep.ac.cn/category/1004/
  - The upcoming CEPC workshops at Barcelona, June 16-19, 2025, https://indico.ifae.es/event/2054/
    at Guangzhou, Nov 6-10, 2025, https://indico.ihep.ac.cn/event/25300/