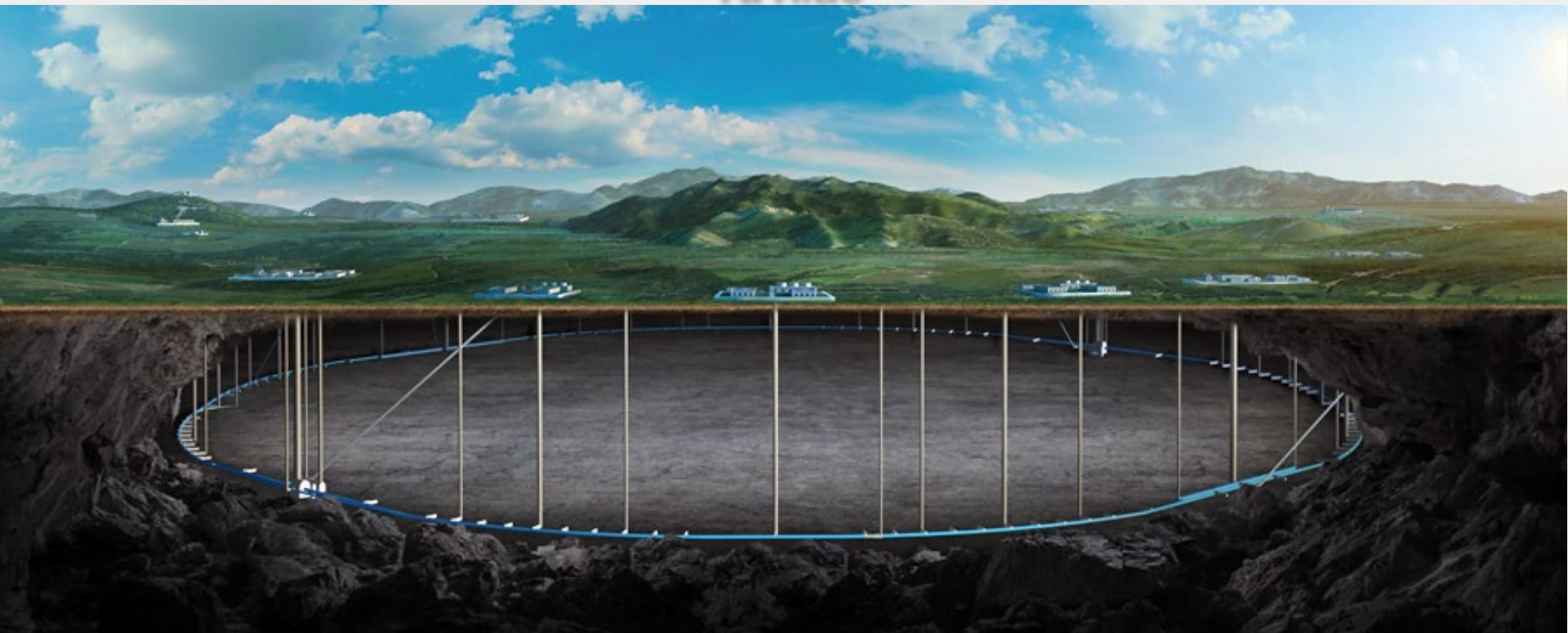


# CEPC Civil Engineering (Qinhuangdao)

Yu Xiao



**Yellow River Engineering Consulting Co., Ltd.**

Nov. 20, 2019



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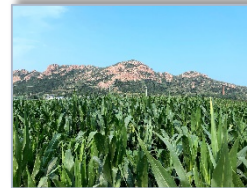
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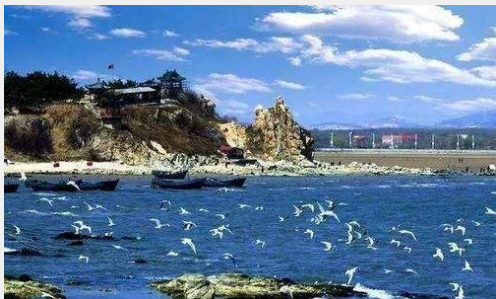
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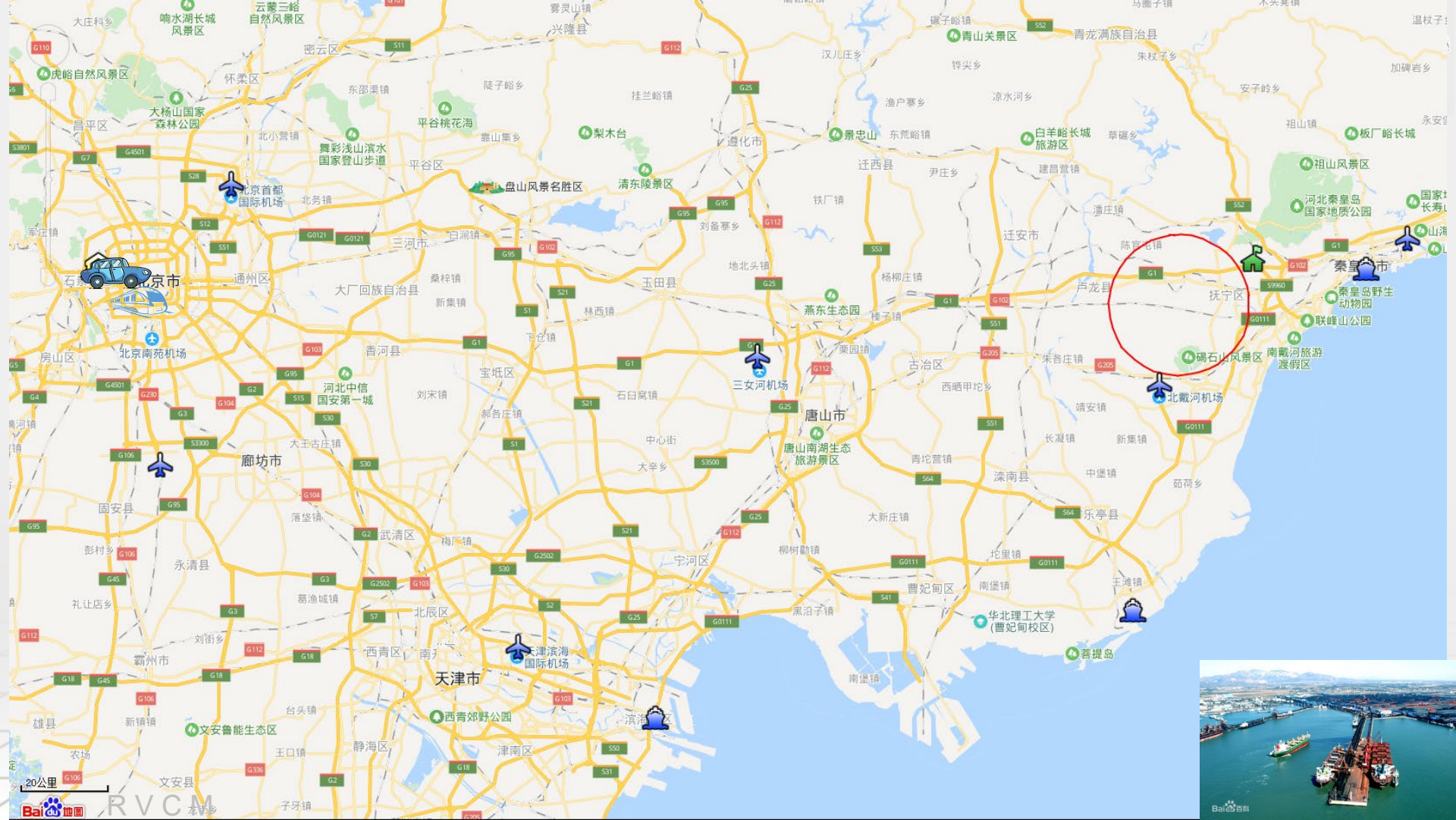
# 1

## Introduction



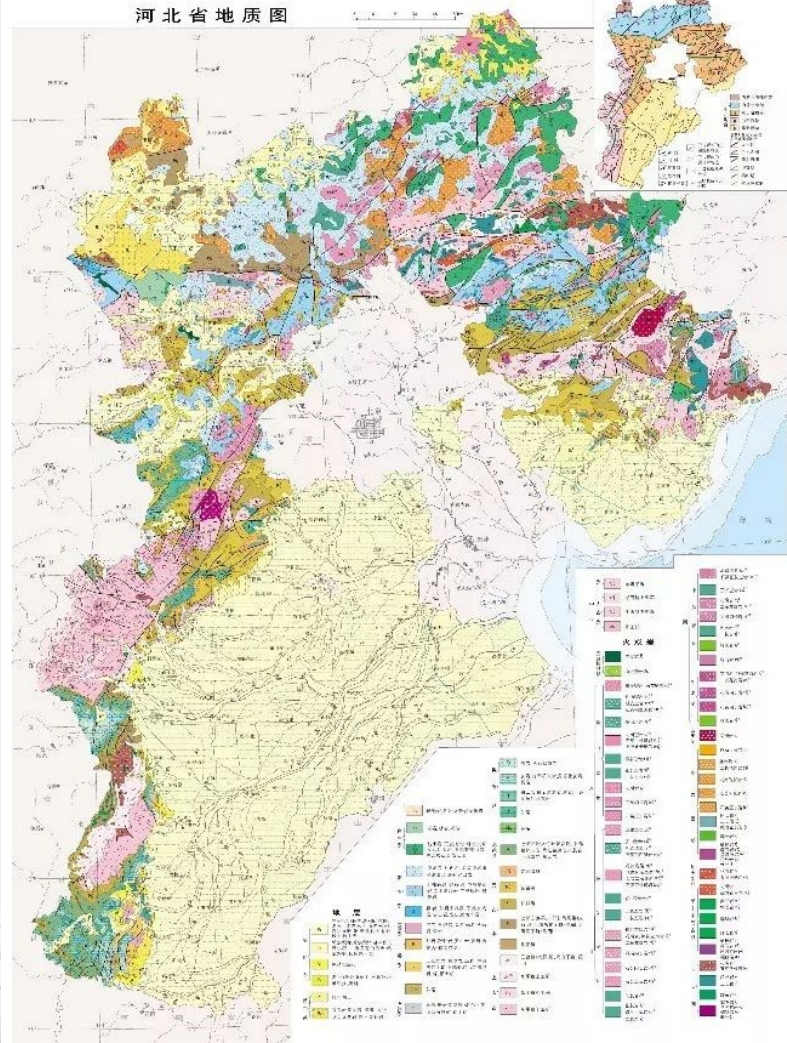


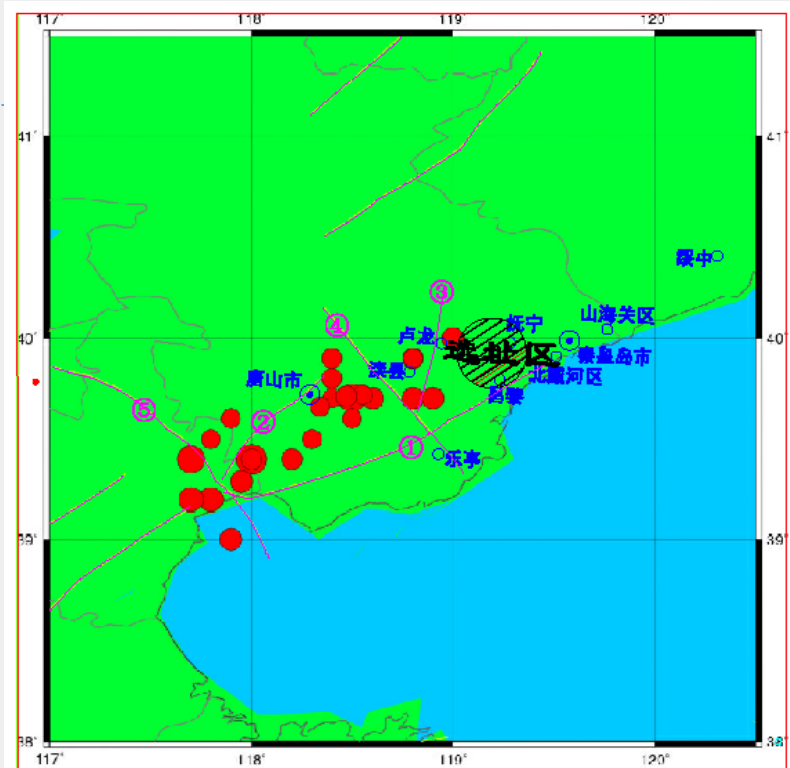




# 2

## Engineering Geology





①: 昌黎断裂 ②: 唐山断裂 ③: 卢龙断裂 ④: 滦县-乐亭断裂 ⑤: 南运河断裂

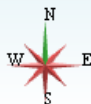
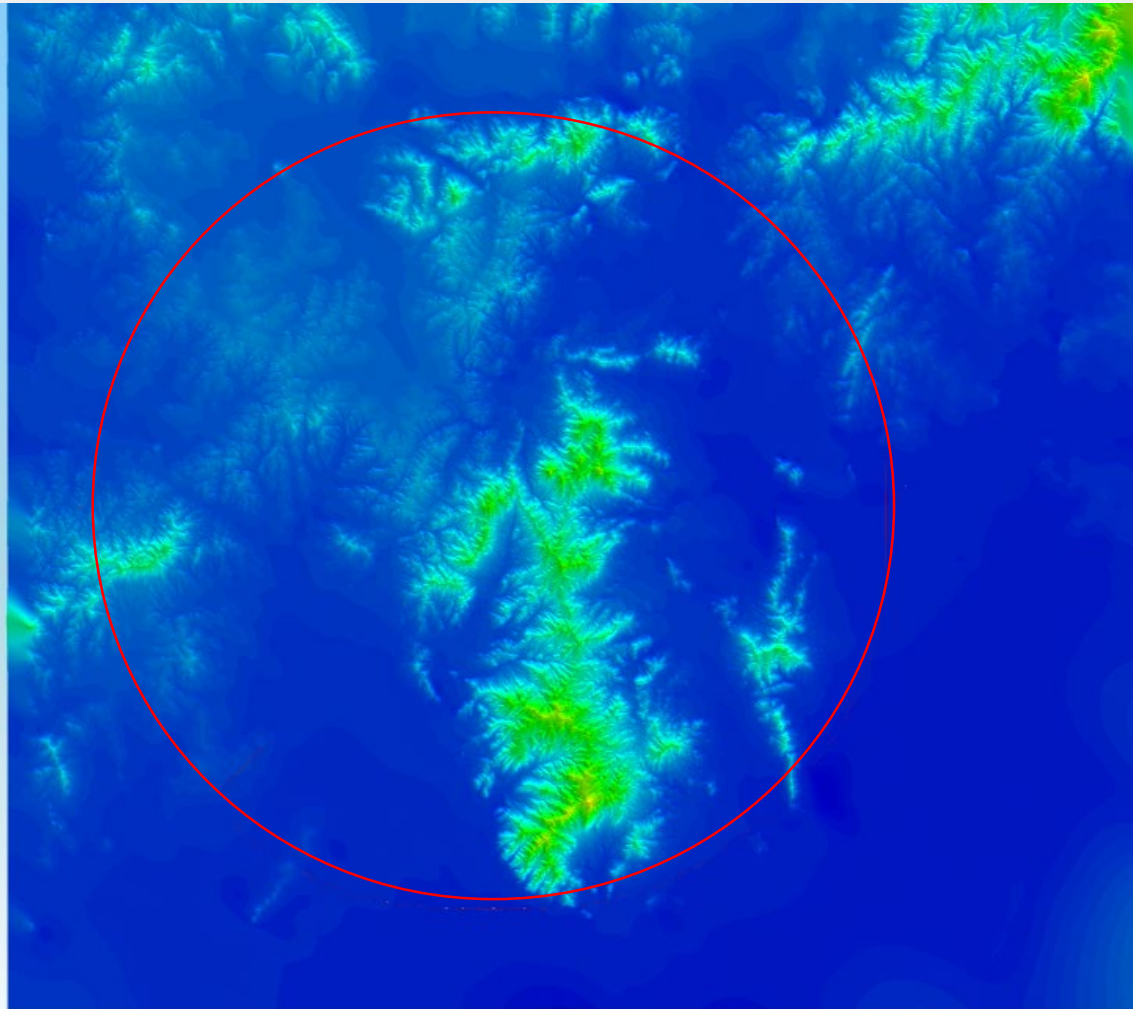
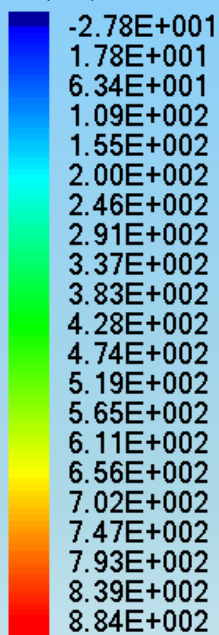


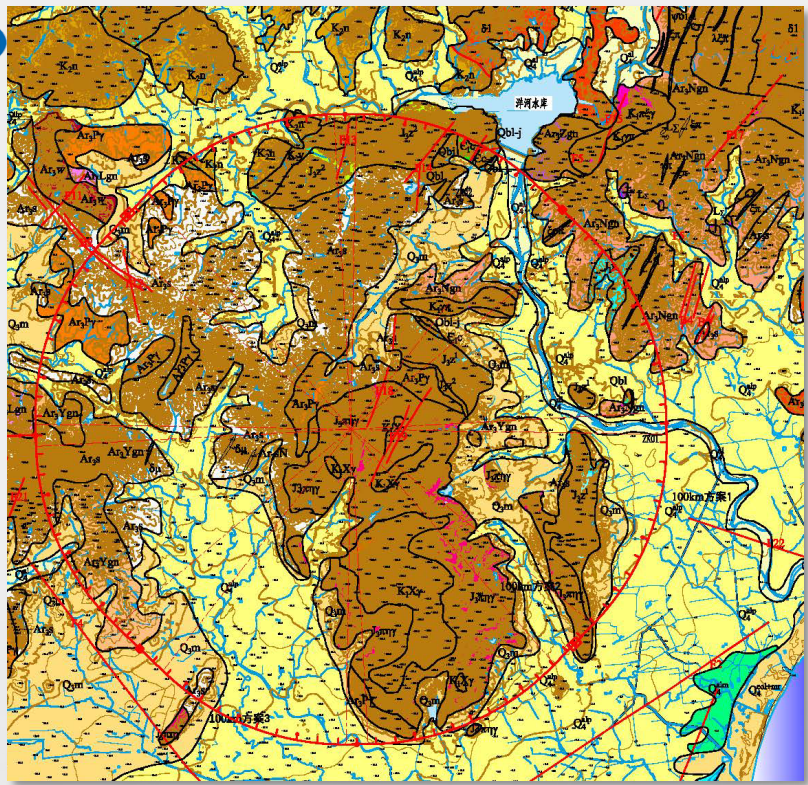


According to the Seismic Ground Motion Parameters Zonation Map of China (GB 18306-2015), the seismic peak ground acceleration to the east of Funing - Changli is 0.10g, while that to the west is 0.15g. The characteristic period of the seismic response spectrum is 0.40s.



地表面:Z





Gneiss



Granite



Sandstone



Tuff

### Stratum Lithology



Drill Holes



Generally, the proposed project site is located in a low hilly area, with a lithology dominated by gneiss and granite. There is no regional major fracture. The seismic peak ground acceleration is 0.10~0.15g and basic earthquake intensity is VII. Exogenic geological processes are not developed, and the thickness of the weathered zone is 20 to 30 m. There are no major engineering geological restrictions, and the site area is suitable for the construction of a large-sale underground project.

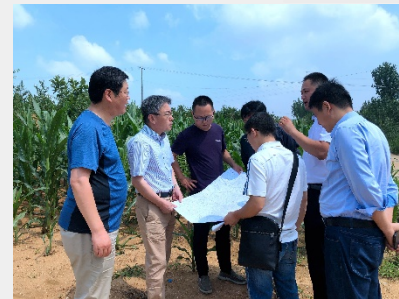
# 3

## TDR Design

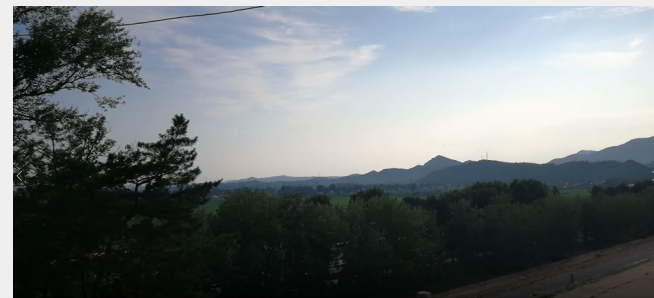
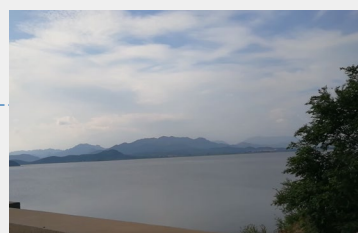
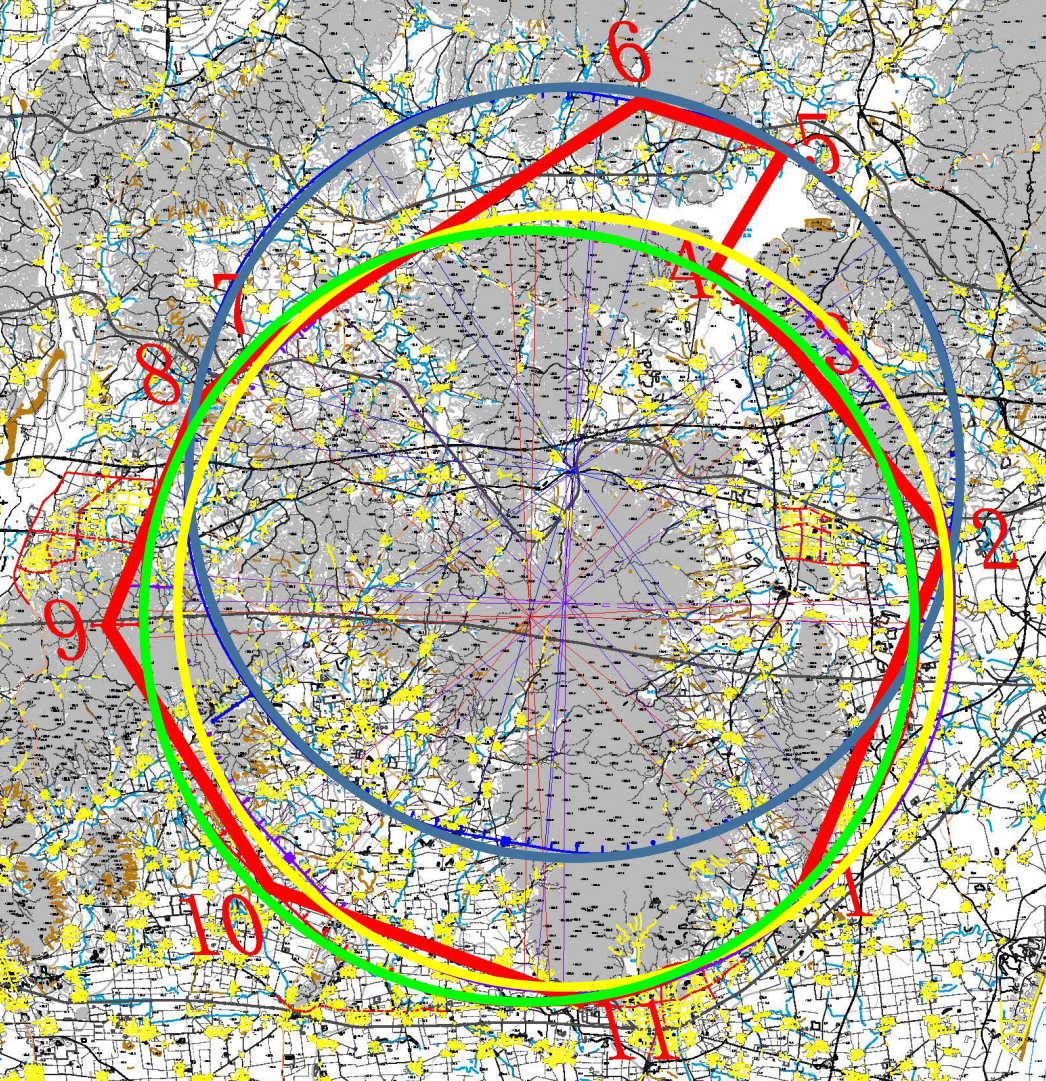


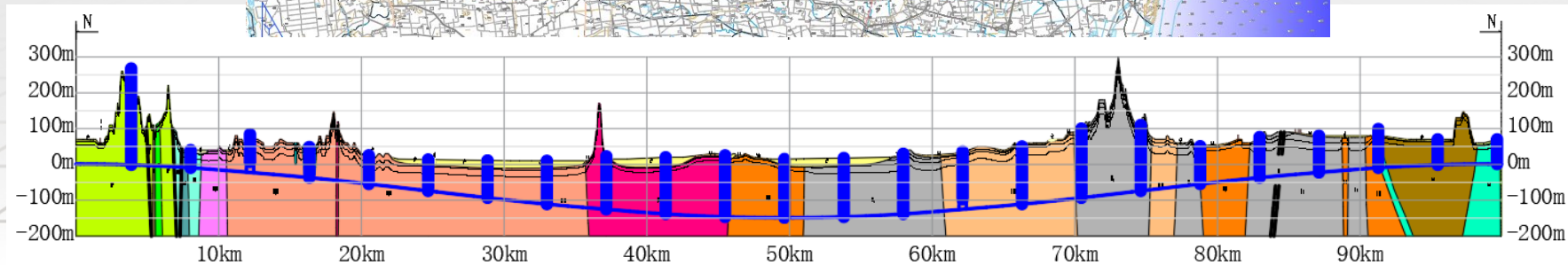
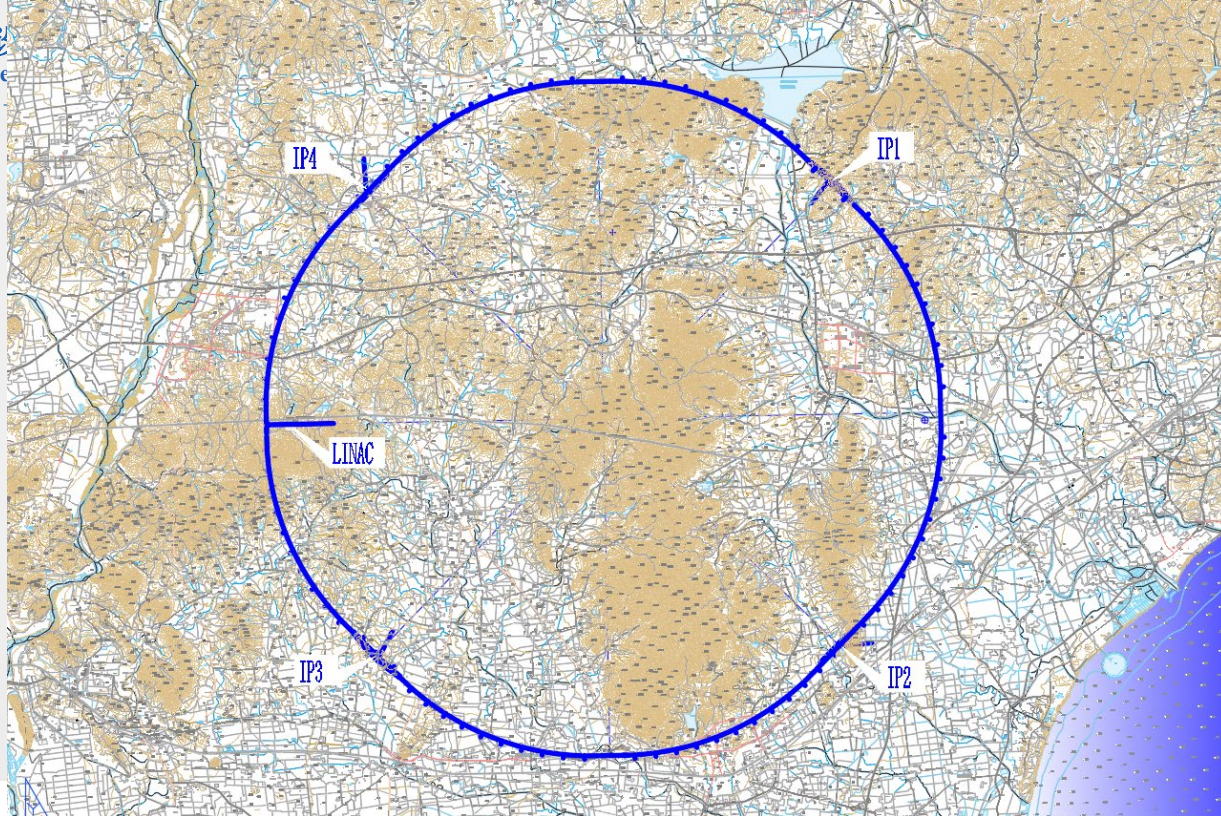


On June 3, 2019, seminar and cooperation conference about CEPC civil engineering design were held in Beijing.



From July 10 to 12, 2019, the project team conducted field investigation of the proposed project site in Qinhuangdao.



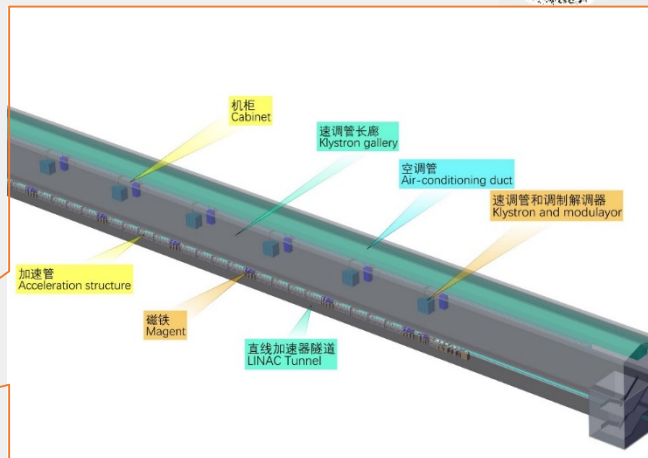
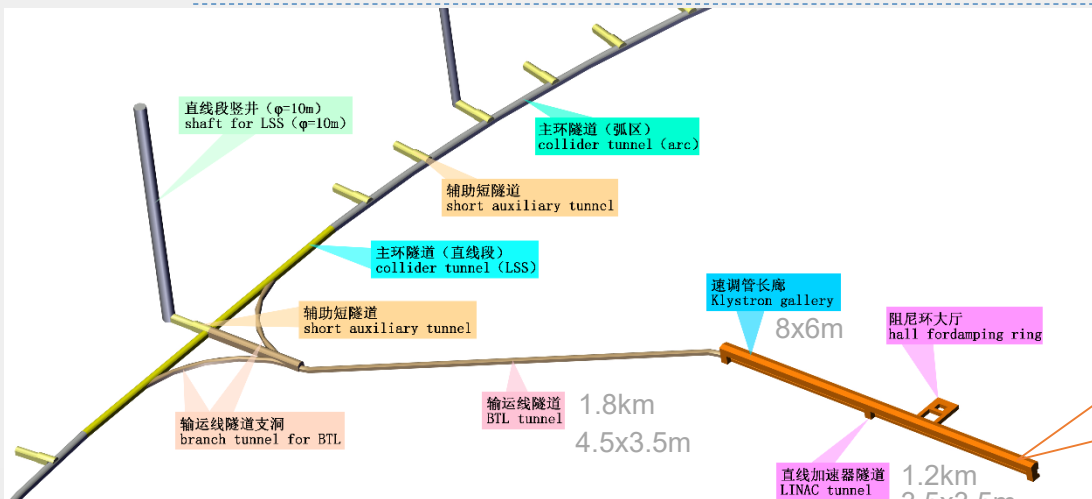




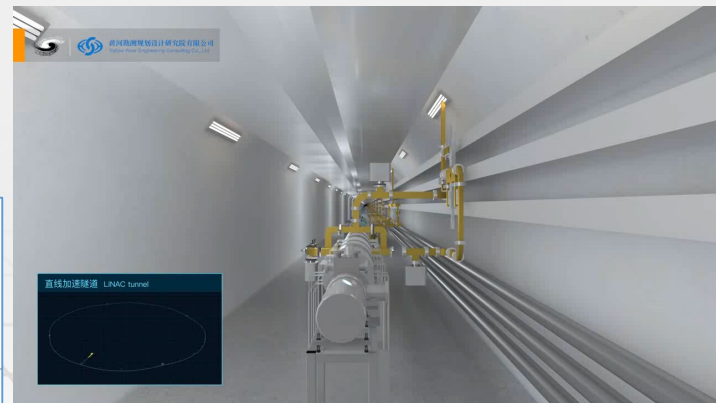
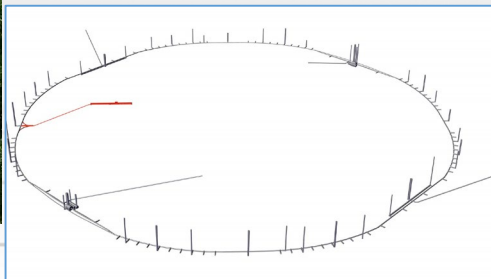


## General Layout

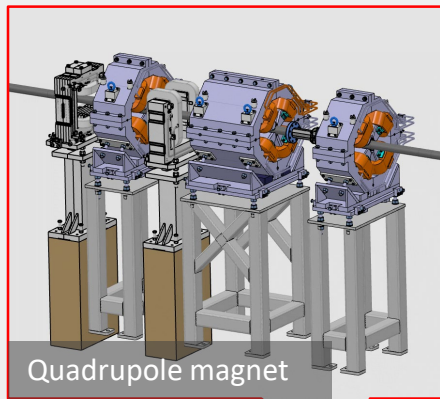




Klystron gallery

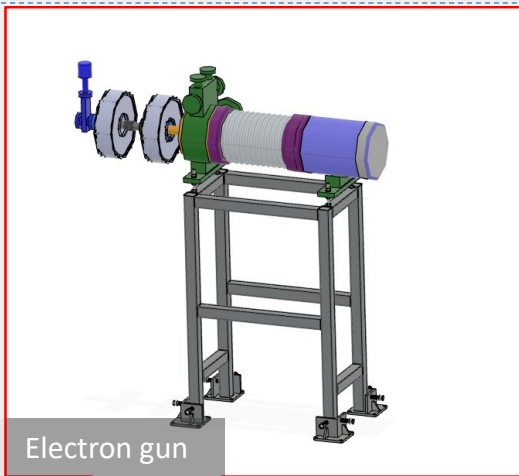


Linac Tunnel & BTL Tunnel

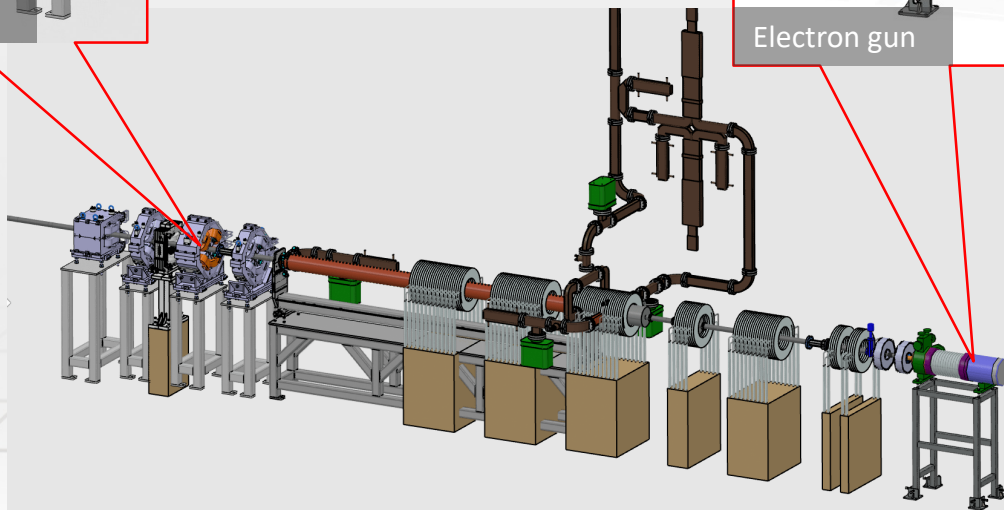


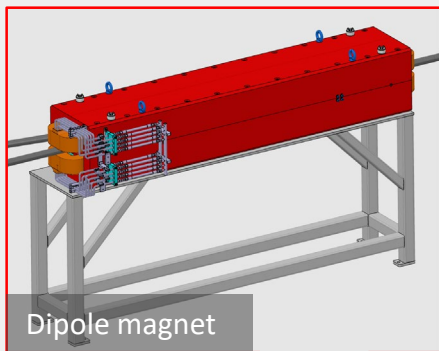
Quadrupole magnet

Linac



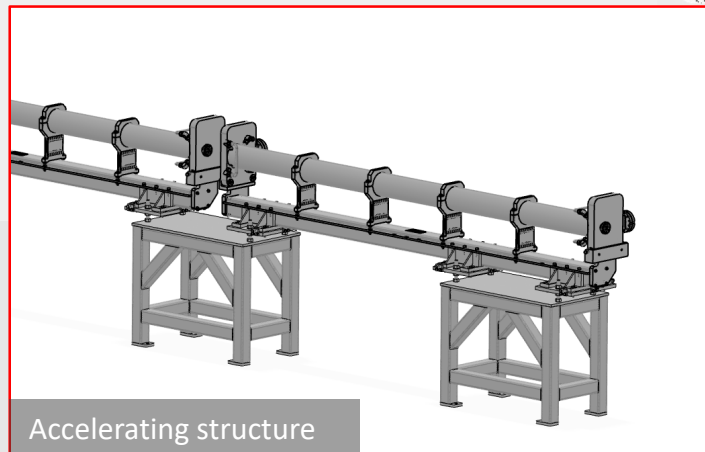
Electron gun



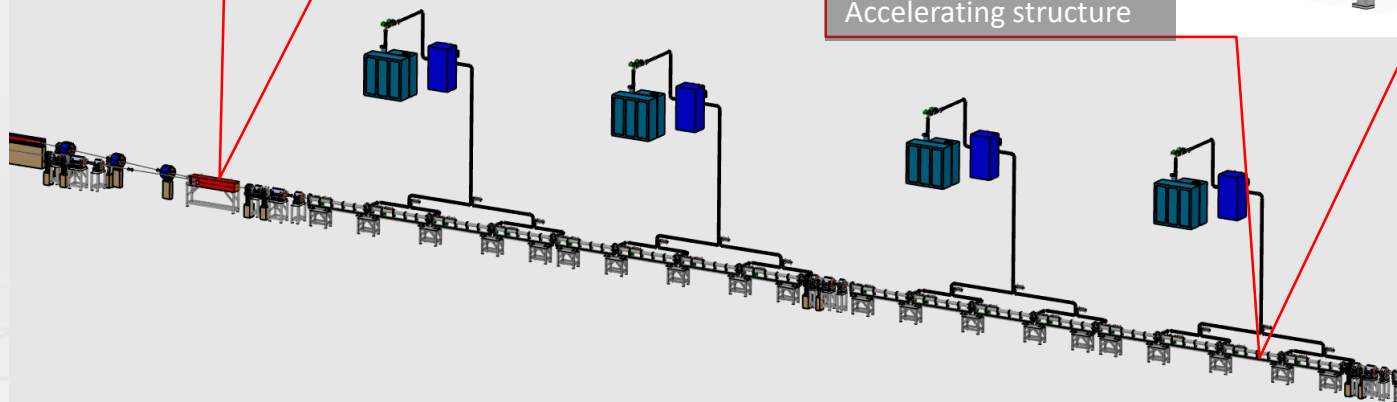


Dipole magnet

Linac

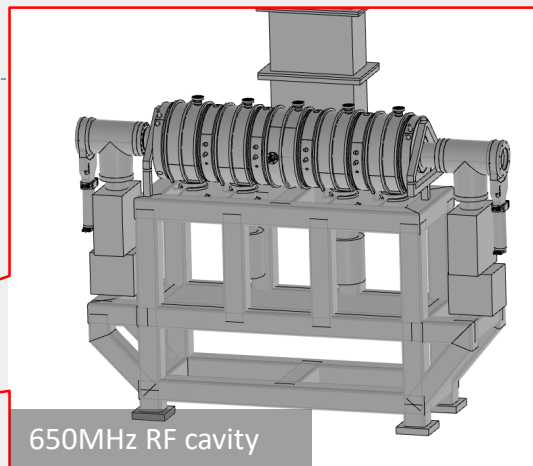
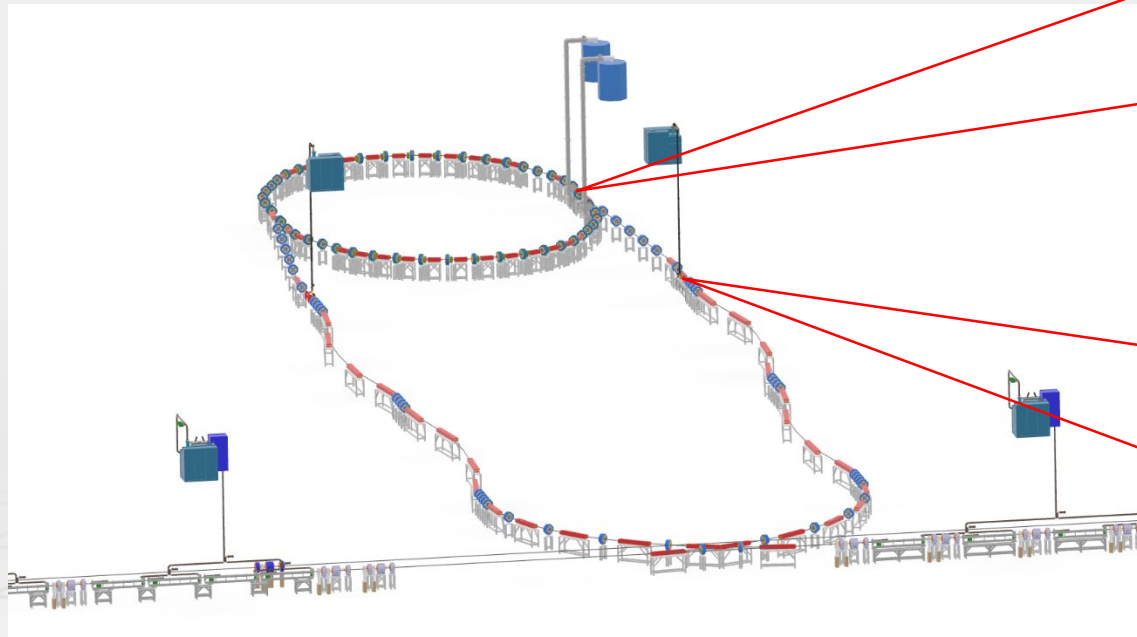


Accelerating structure

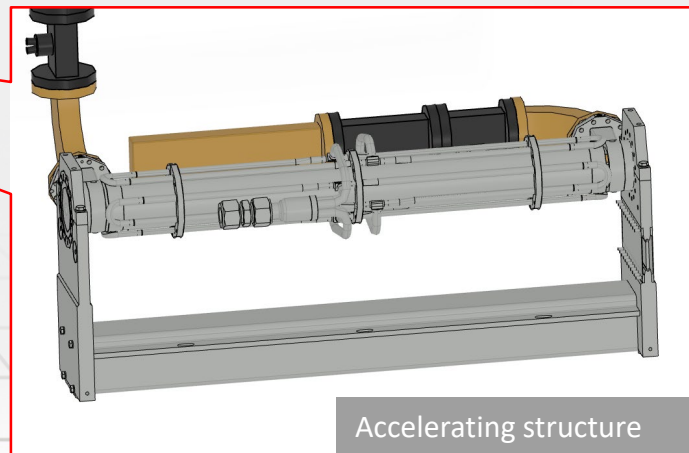




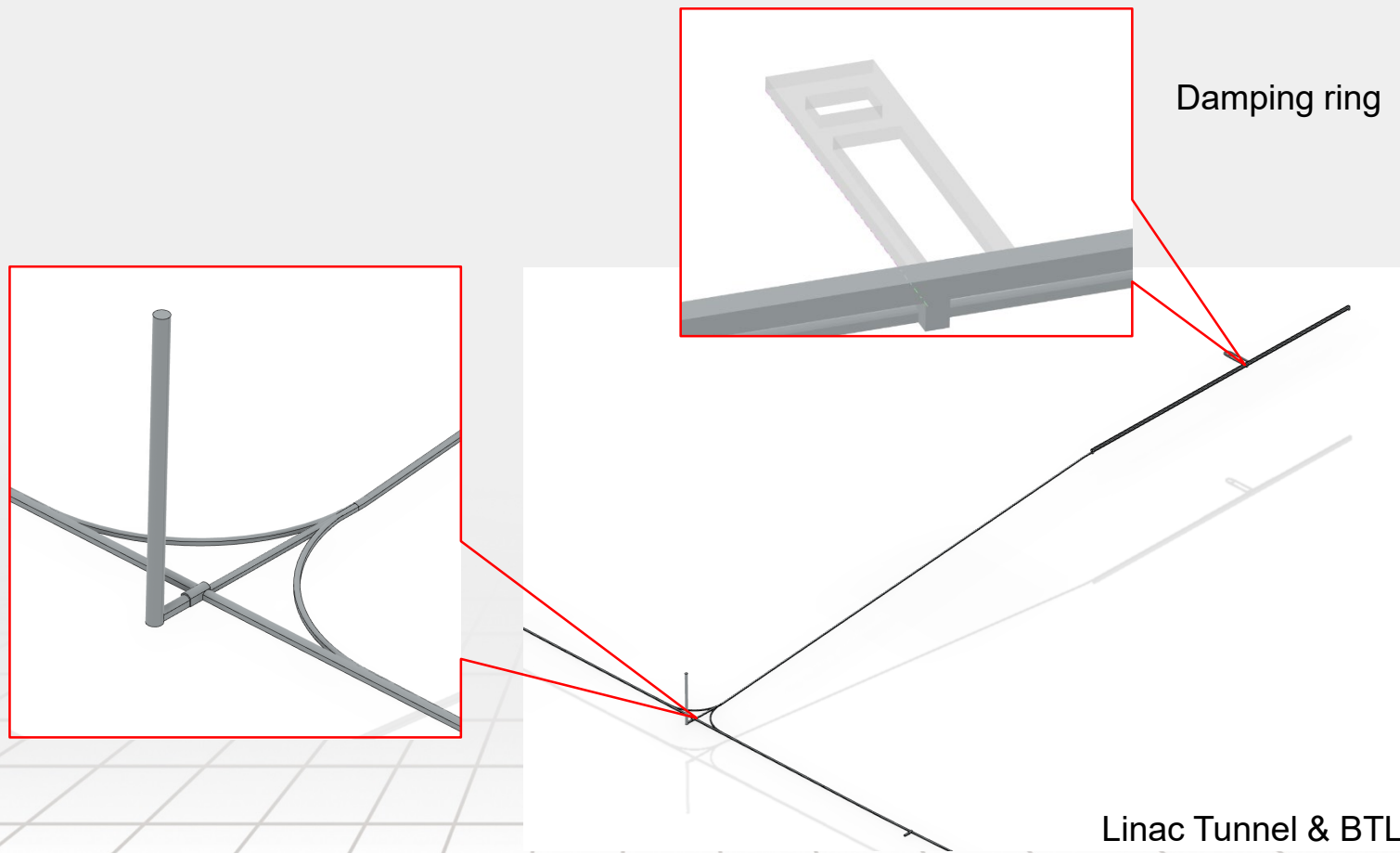
Damping ring

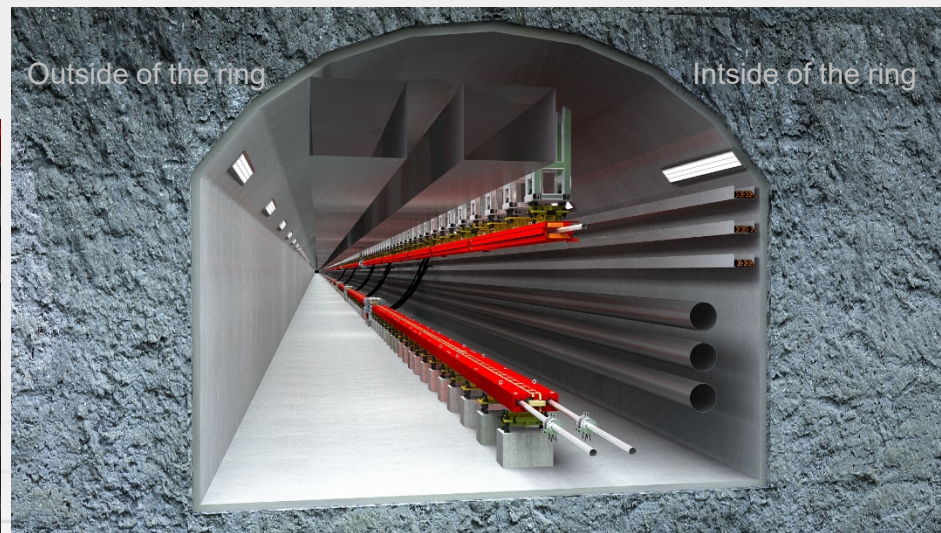
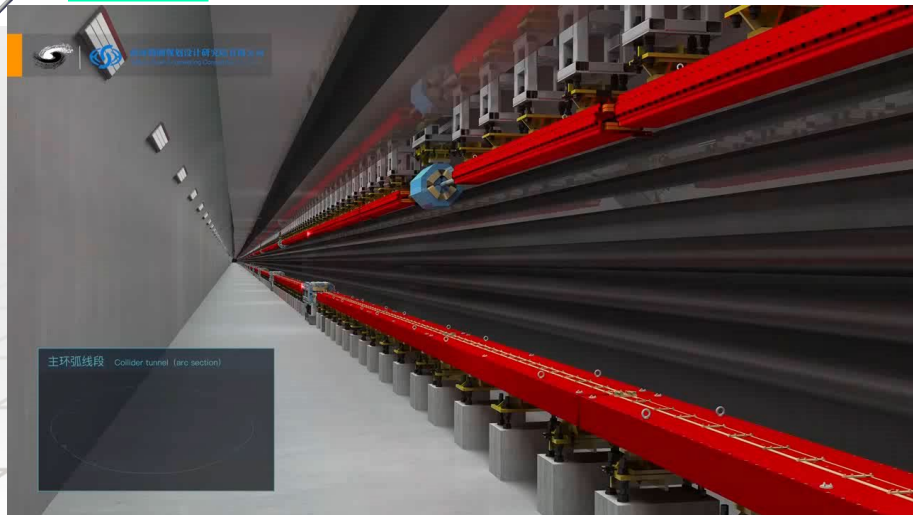
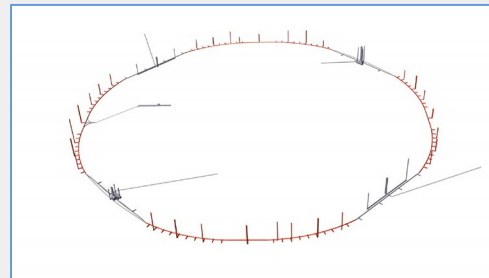
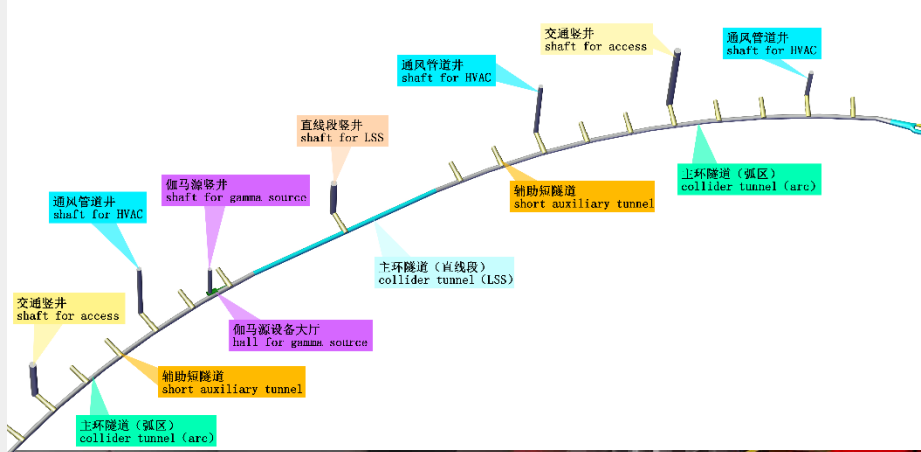


650MHz RF cavity



Accelerating structure

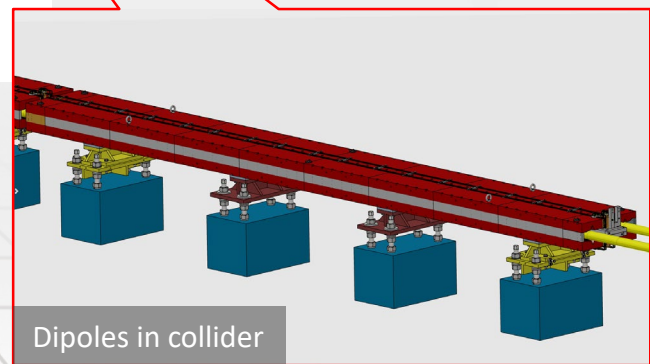
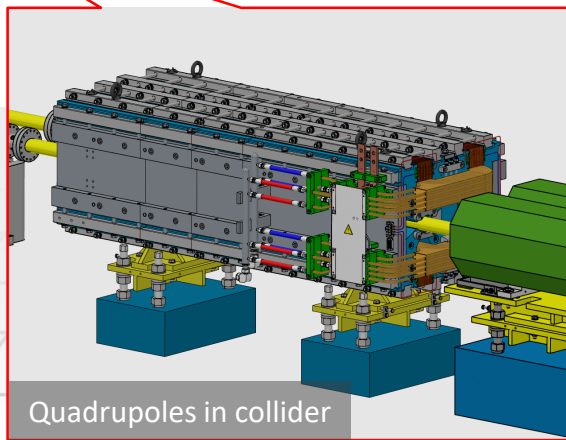
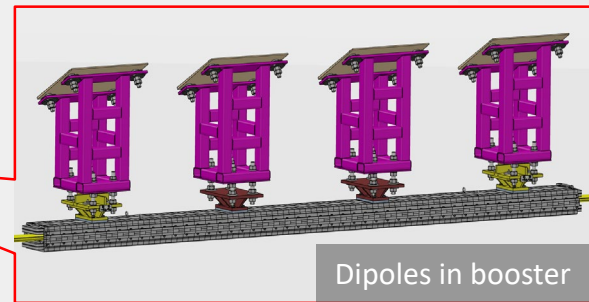
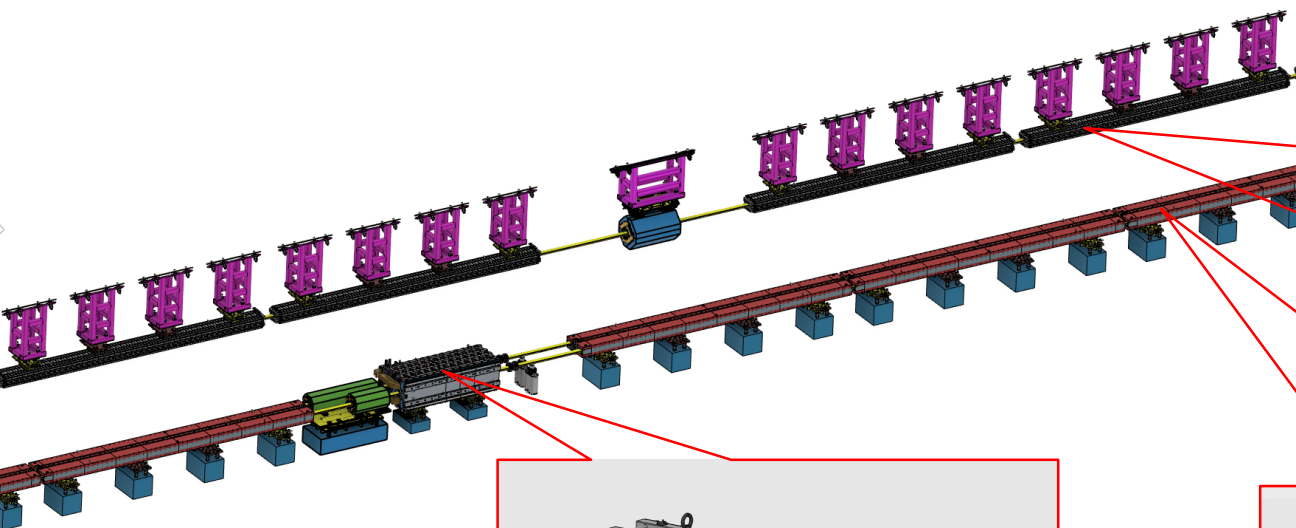




Typical cross section of collider tunnel



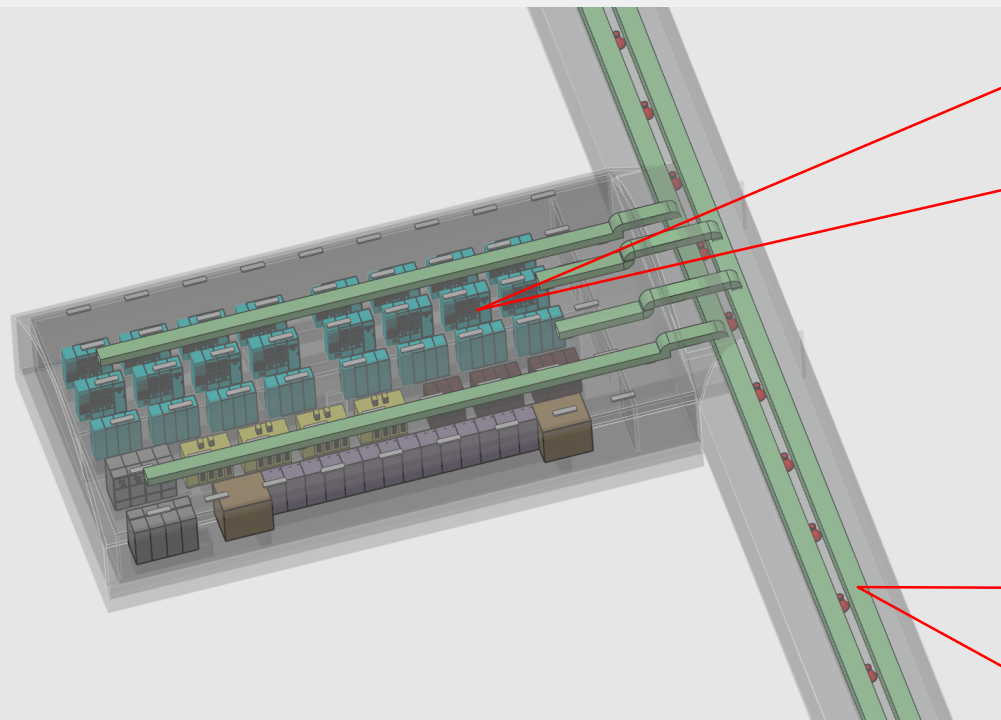
### Collider ring tunnel (arc section)



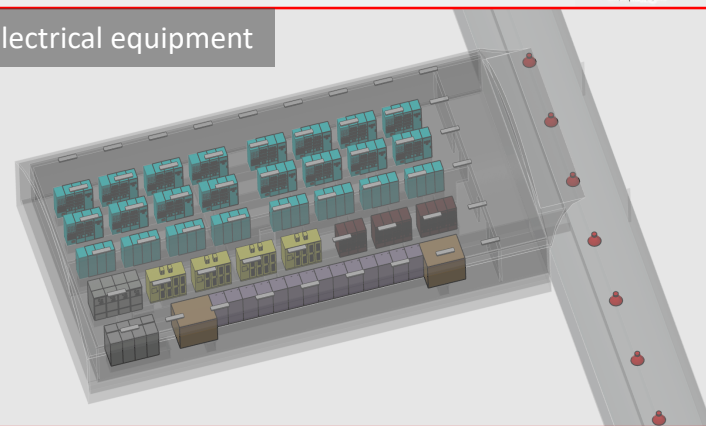




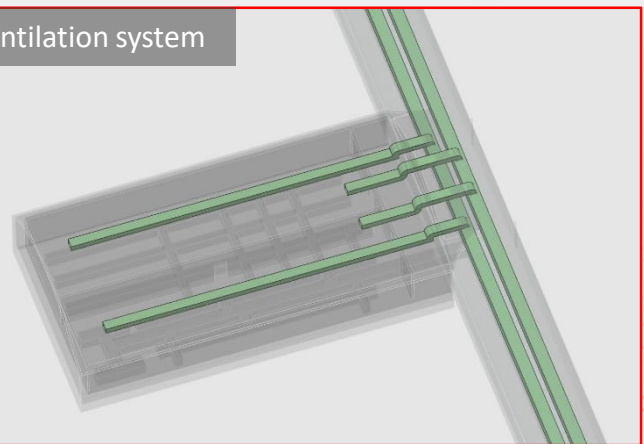
## Auxiliary stub tunnels

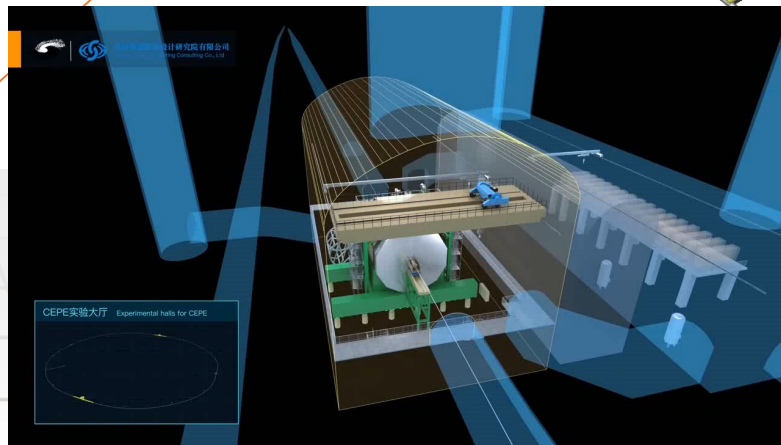
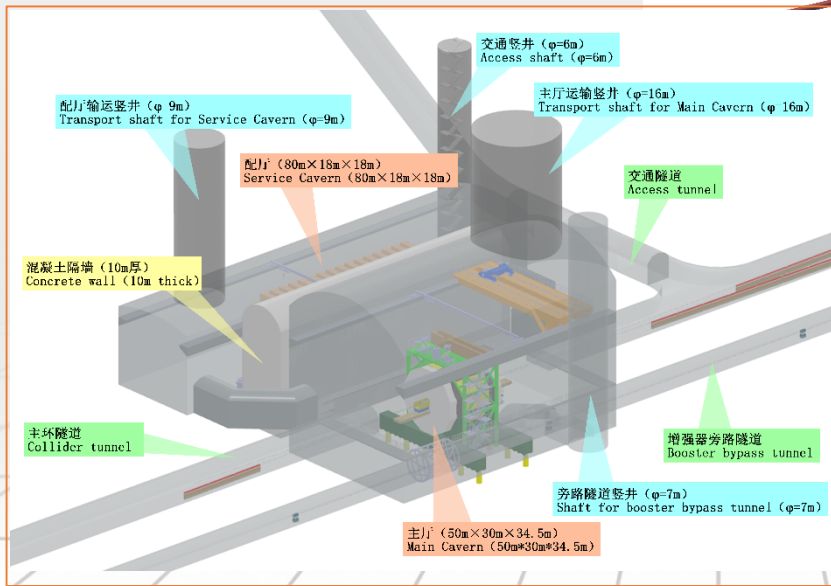
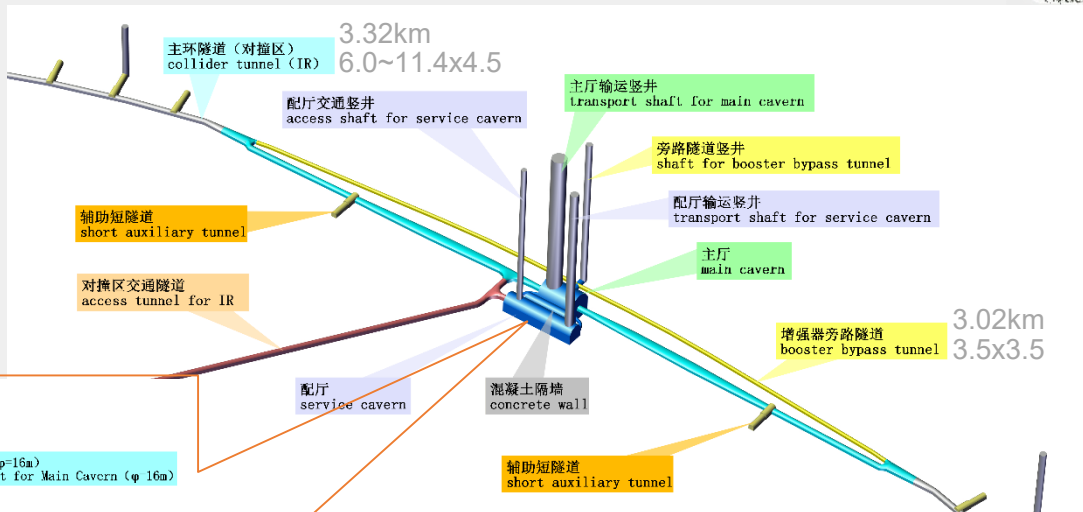
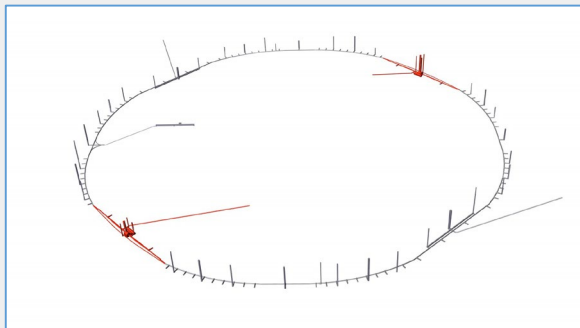


Electrical equipment



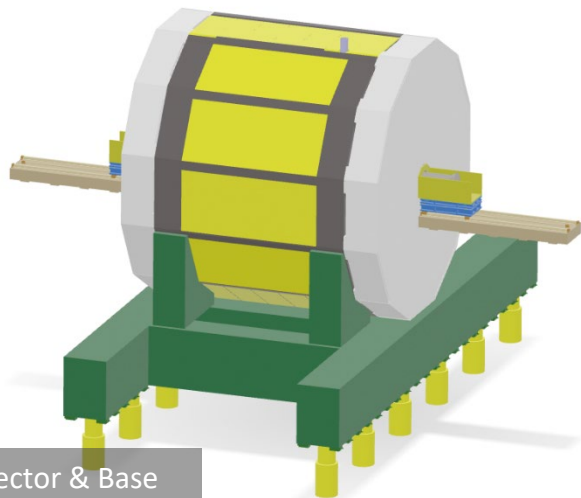
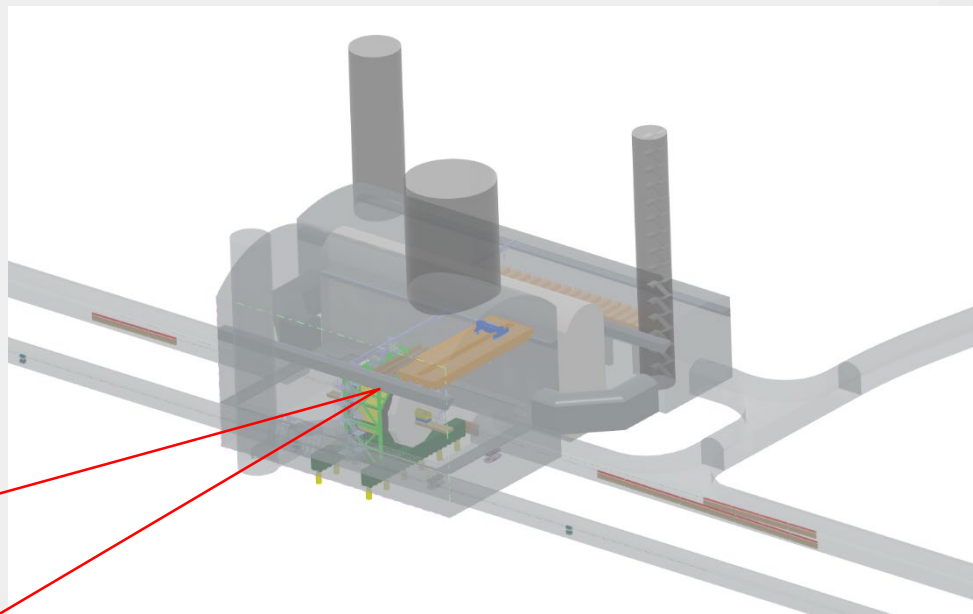
Ventilation system



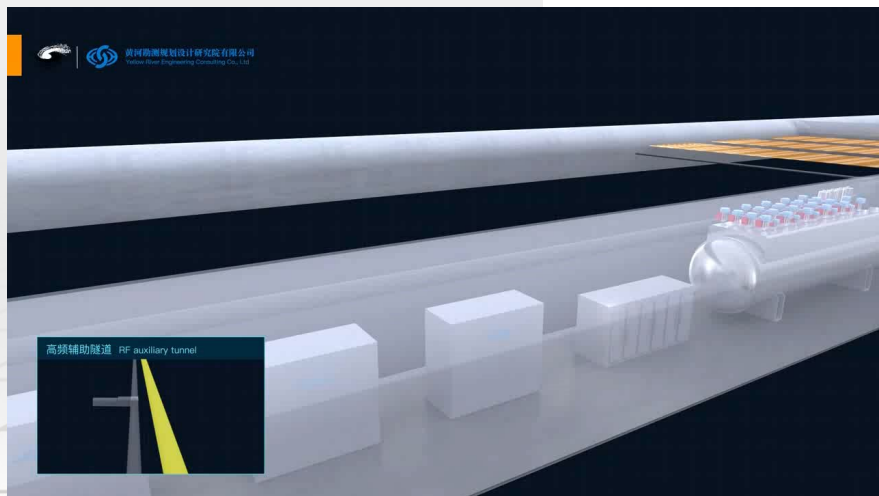
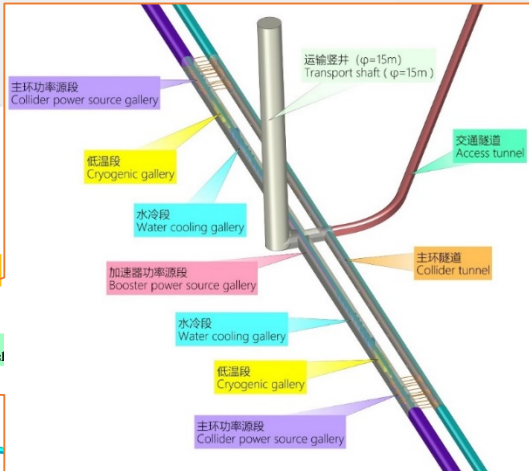
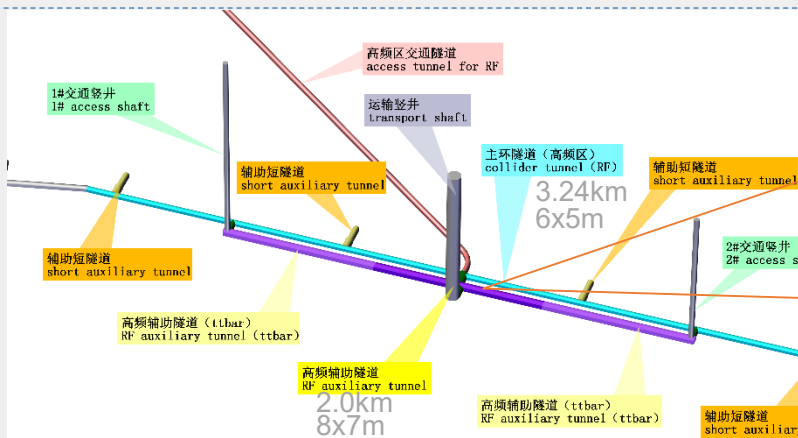
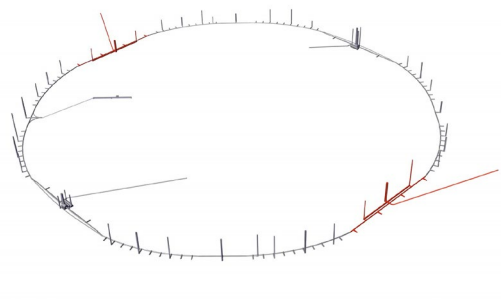




IP1 / IP3



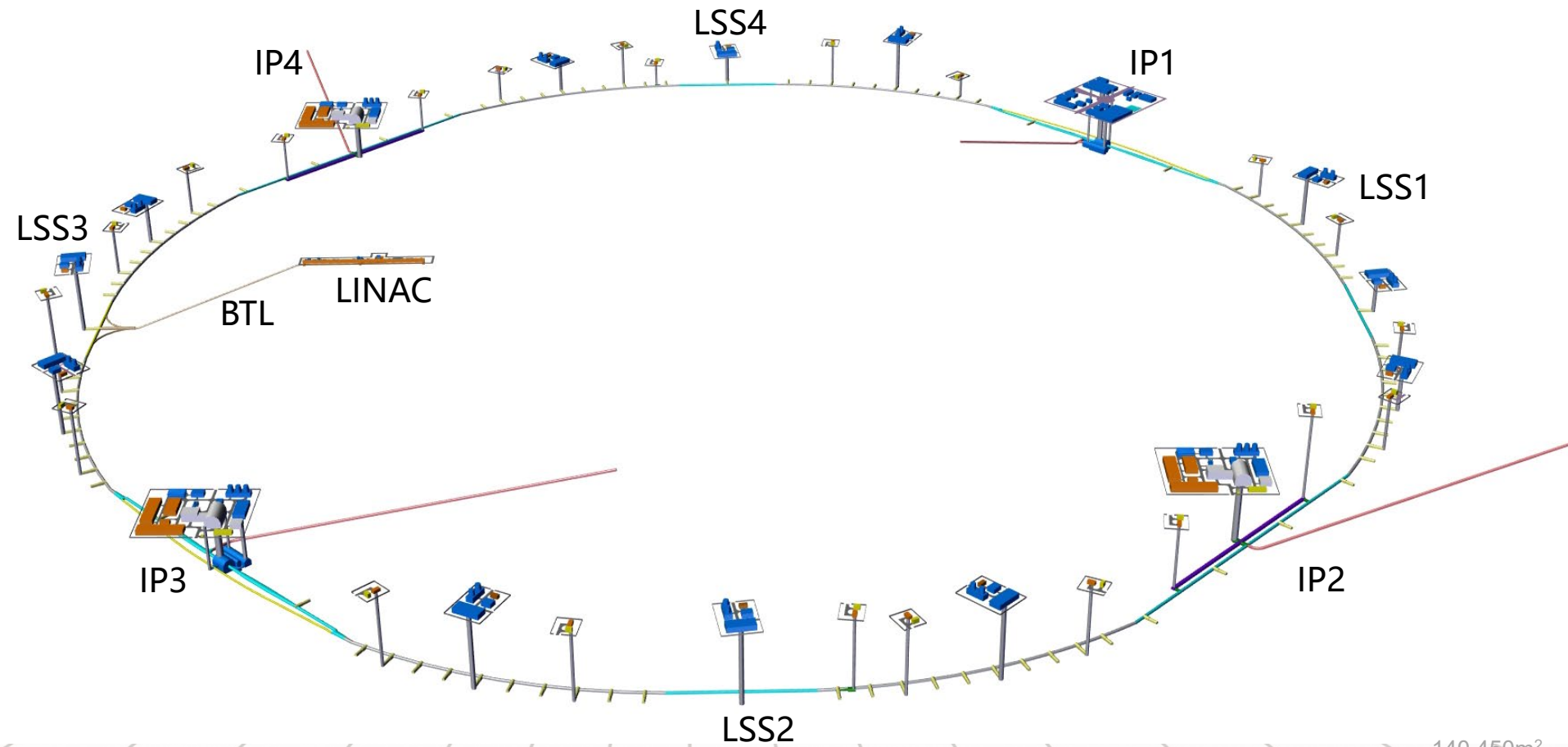
Detector & Base



RF Auxiliary Tunnel



Collider Tunnel (RF)



IP1

Detector assembly hall

Data center / Control room

HVAC system

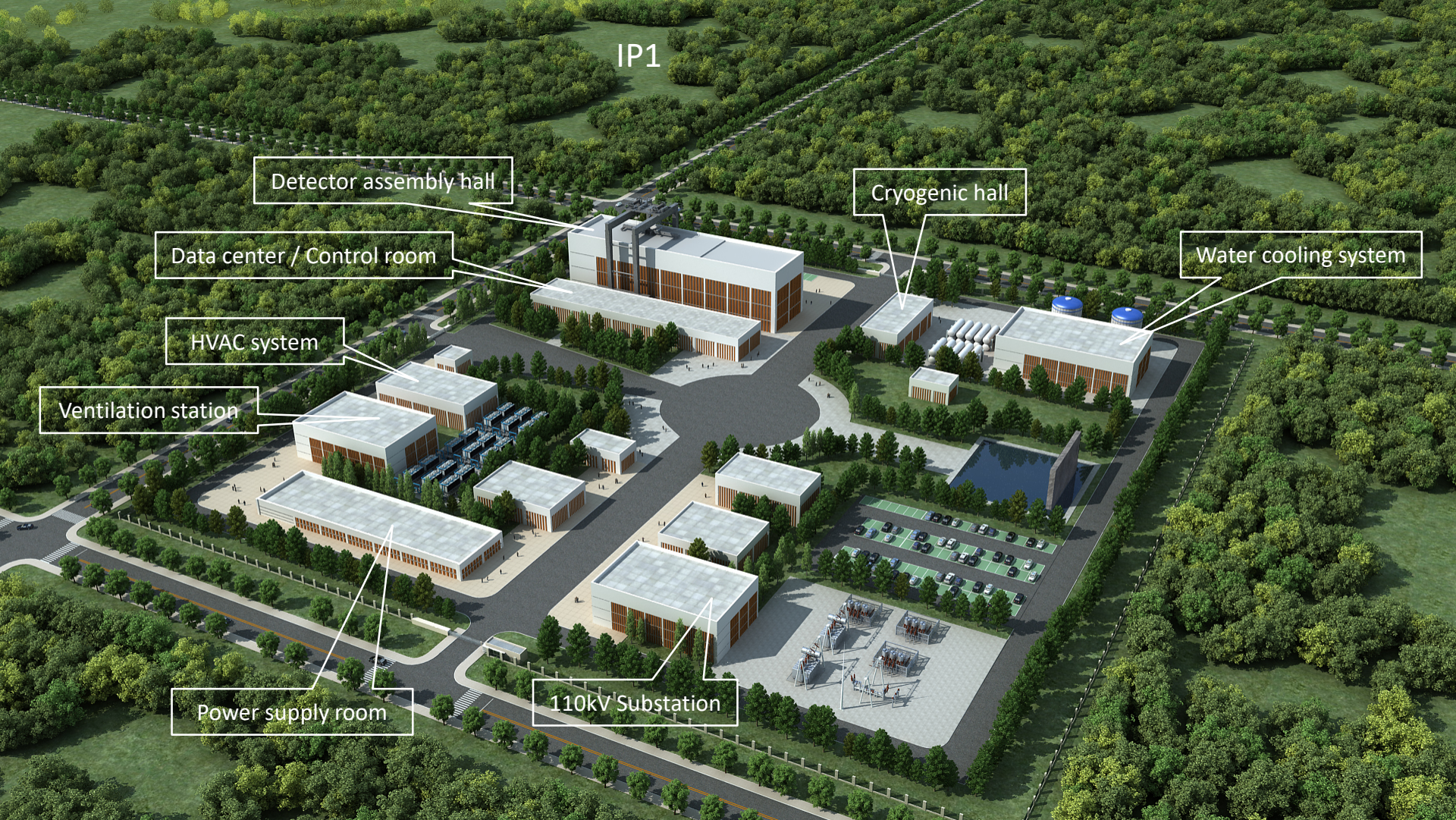
Ventilation station

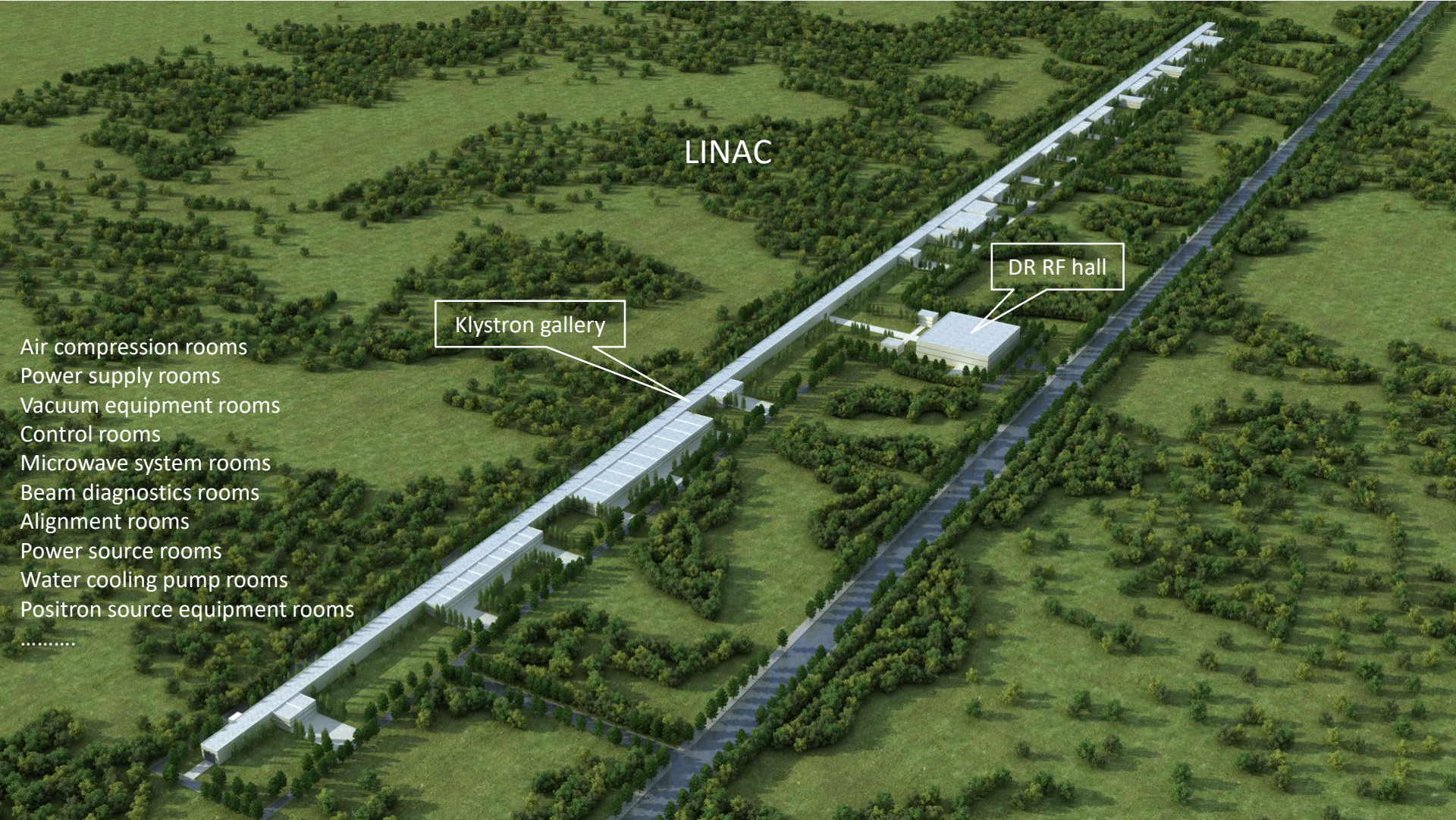
Power supply room

110kV Substation

Cryogenic hall

Water cooling system





# LINAC

Klystron gallery

DR RF hall

- Air compression rooms
- Power supply rooms
- Vacuum equipment rooms
- Control rooms
- Microwave system rooms
- Beam diagnostics rooms
- Alignment rooms
- Power source rooms
- Water cooling pump rooms
- Positron source equipment rooms
- .....



## Auxiliary Facilities

08:00

09:00

10:00

EDM and anomalous magnetic moment of tau at CEPC <i>B410, IHEP</i>	theoretical uncertainties for EW/Higgs-boson precision measurement at CEPC <i>A415, IHEP</i>	Mechanical Integration in the SuperKEKB Interaction Region <i>A511, IHEP</i>	Vertex and silicon tracker TPC <i>A623, IHEP</i>	CEPC YU XIAO civil engineering (Qinhuangdao) <i>B326, IHEP</i>	佳斌 王 Installation and store
	Z decay into pipi, KK <i>B410, IHEP</i>	Global fits of EW, Diboson and Higgs <i>A415, IHEP</i>	Integration Design in the CEPC Interaction Region <i>A511, IHEP</i>	CEPC civil engineering (Huzhou) <i>B326, IHEP</i>	SppC 建伟 刘 magnet <i>C305, IHEP</i>
Heavy Qin QIN neutrino searches at future Z-factories <i>B410, IHEP</i>	Discussion <i>A415, IHEP</i>	Focusing Quadrupole Design for CEPC <i>A511, IHEP</i>	PFA ECAL <i>A623, IHEP</i>	CEPC civil engineering (Changsha) <i>B326, IHEP</i>	SppC 跃 赵 magnet <i>C305, IHEP</i>
			PFA HCAL <i>A623, IHEP</i>		SppC 伟兵 蔡 magnet <i>C305, IHEP</i>
TBD <i>B410, IHEP</i>	Solenoid magnet Design for CEPC <i>A415, IHEP</i>	Solenoid magnet Design for CEPC <i>A511, IHEP</i>	Dual Readout Calorimetry	CEPC Auxiliary Facilities <i>B326, IHEP</i>	SppC 彬 赵 magnet <i>C305, IHEP</i>
TBD <i>B410, IHEP</i>			Crystal ECAL		RPC and scintillator ... <i>B326, IHEP</i>
	TBD <i>B410, IHEP</i>	Solenoid magnet Design for CEPC <i>A415, IHEP</i>	Solenoid magnet Design for CEPC <i>A511, IHEP</i>	IDEA wire chamber	CEPC installation and alignment <i>B326, IHEP</i>
IDEA muon detector				CEPC installation and alignment <i>B326, IHEP</i>	

9:30-9:50





**Future Steps**





Site selection

Alignment optimization

Refine designs for all structures

Construction strategy

Design and optimization of ventilation and air-conditioning system

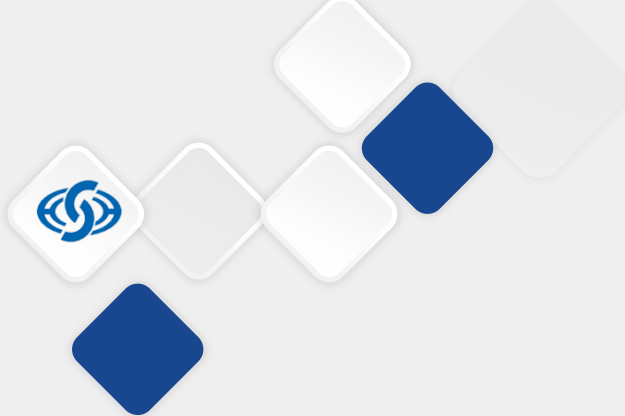
Design and optimization of fire control system

BIM design

Green design

Cost & schedule estimate

.....



YREC

感谢您的聆听

THANK YOU FOR LISTENING

Nov

2019