



Facility for Jiangmen Underground Neutrino Observatory (JUNO Experiment)

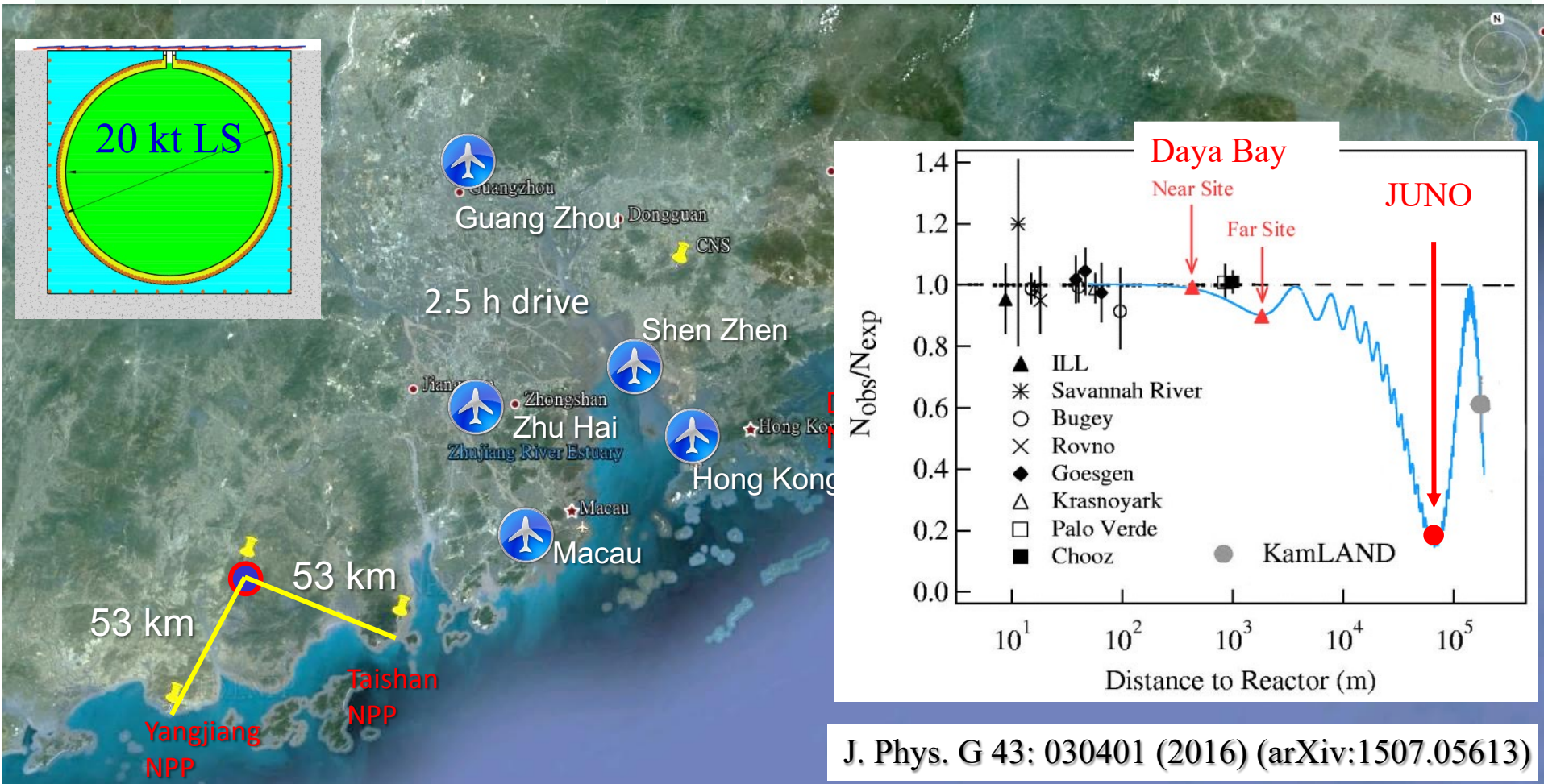
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- **Location of facility**
- **Above/under ground facility**
- **Underground access**
- **Underground experimental hall**
- **Clean power/ground**
- **Summary**

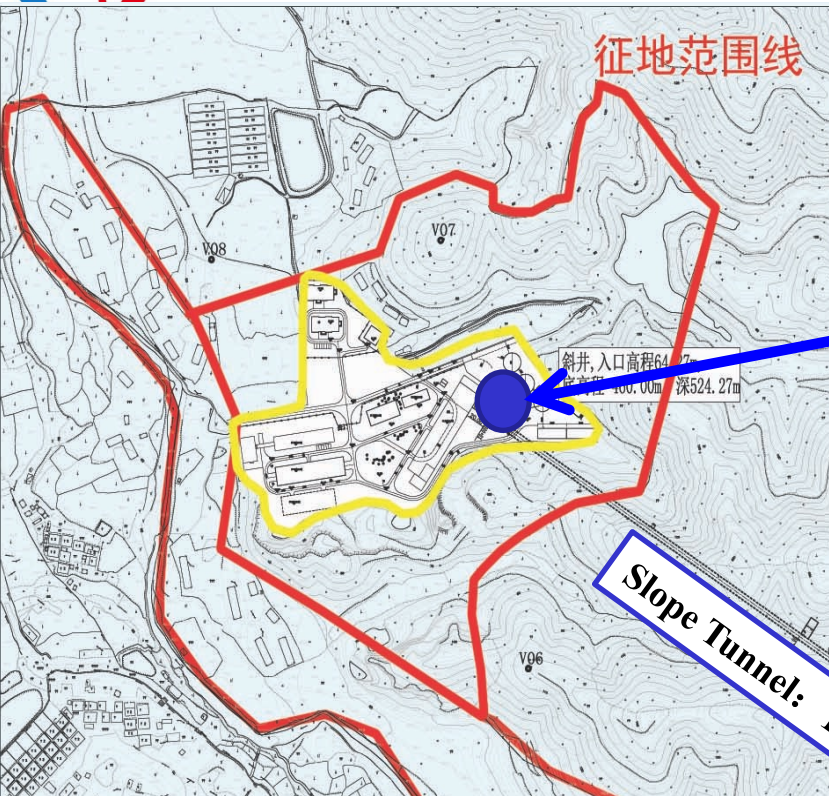


The Location of JUNO Facility

NPP	Daya Bay	Huizhou	Lufeng	Yangjiang	Taishan
Status	Operational	Planned	Planned	Operational	Operational
Power	17.4 GW	17.4 GW	17.4 GW	17.4 GW	18.4 GW



J. Phys. G 43: 030401 (2016) (arXiv:1507.05613)



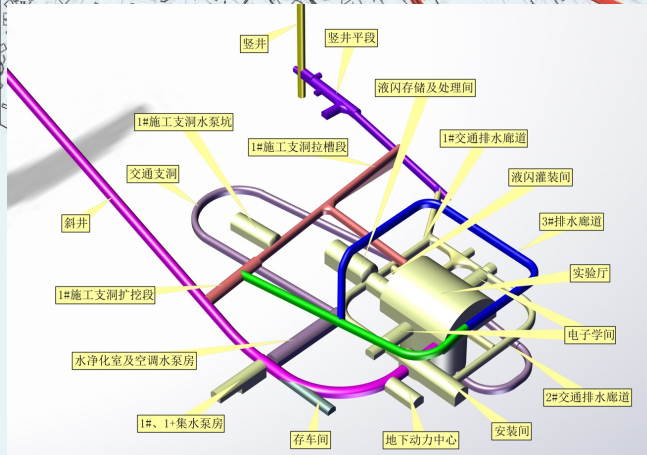
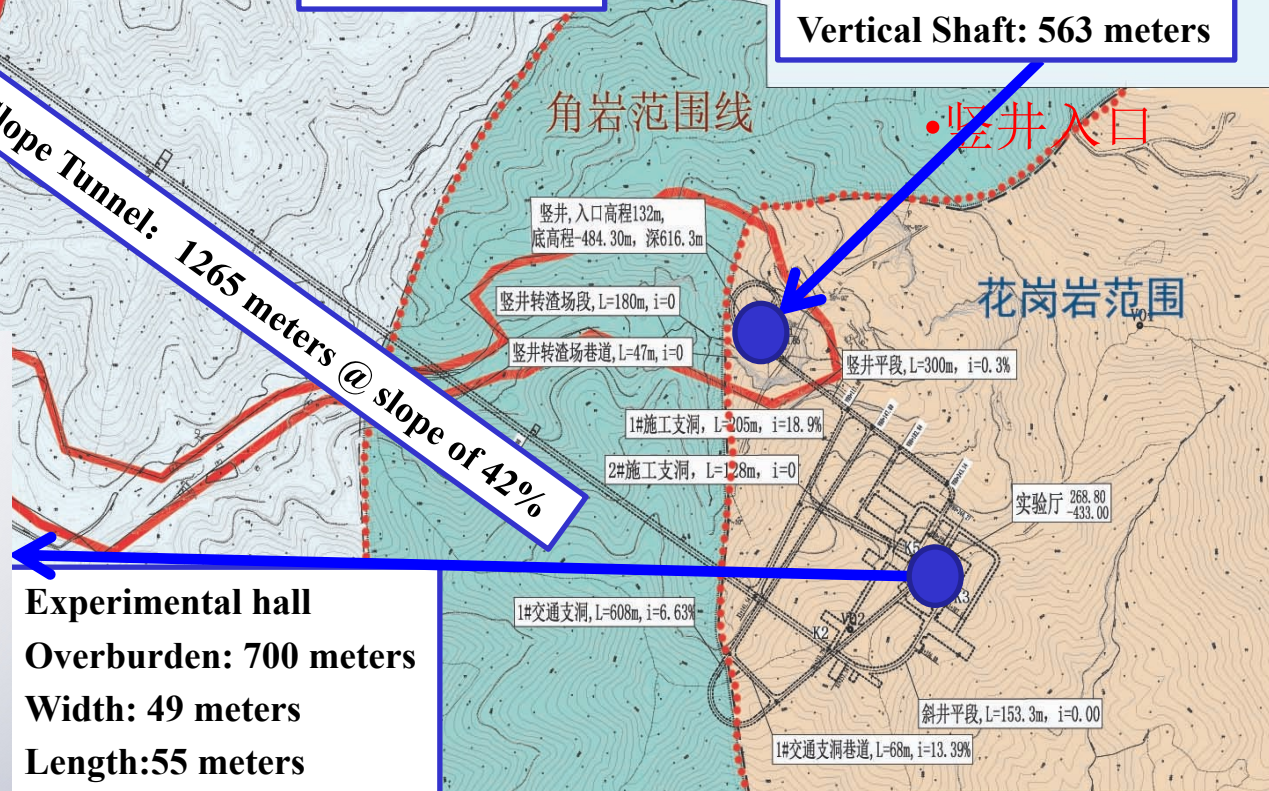
Surface Campus



Vertical Shaft: 563 meters

Slope Tunnel: 1265 meters @ slope of 42%

Experimental hall
Overburden: 700 meters
Width: 49 meters
Length: 55 meters



Bird-eye view of Facility

- Surface assembly building
- LAB storage (5kt)
- LS purification and mixing
- Water purification system
- Chilling water system
- Computing and power station
- Office, dorm and canteen





Cable Car in the Sloped Tunnel



For people, materials and equipment

Underground Facility Layout

控制点坐标表

坐标点	X	Y
K'	2447649.232	347030.623
K'	2447666.377	347004.496
K'	2447680.093	346983.595
X5	2447616.713	346879.258
X6	2447599.594	346905.486
X7	2447388.070	346922.910
X8	2447602.442	346992.145
X9	2447608.548	346996.020
X10	2447629.874	346950.341
S1	2447755.981	347015.689
S2	2447717.944	347011.124
S3	2447699.342	346998.917
P1	2447669.893	346950.289
P2	2447642.199	346954.038
P3	2447659.664	347063.494
P4	2447687.338	347057.735

Transportation tunnel

Pure water room

LS room

LS filling room

Water pump

Rest room

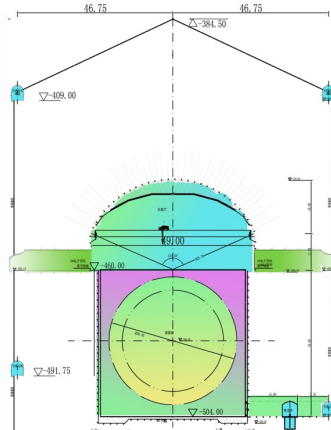
Electronics rooms

Ex Hall

Power hall

Installation hall

Ventilation room

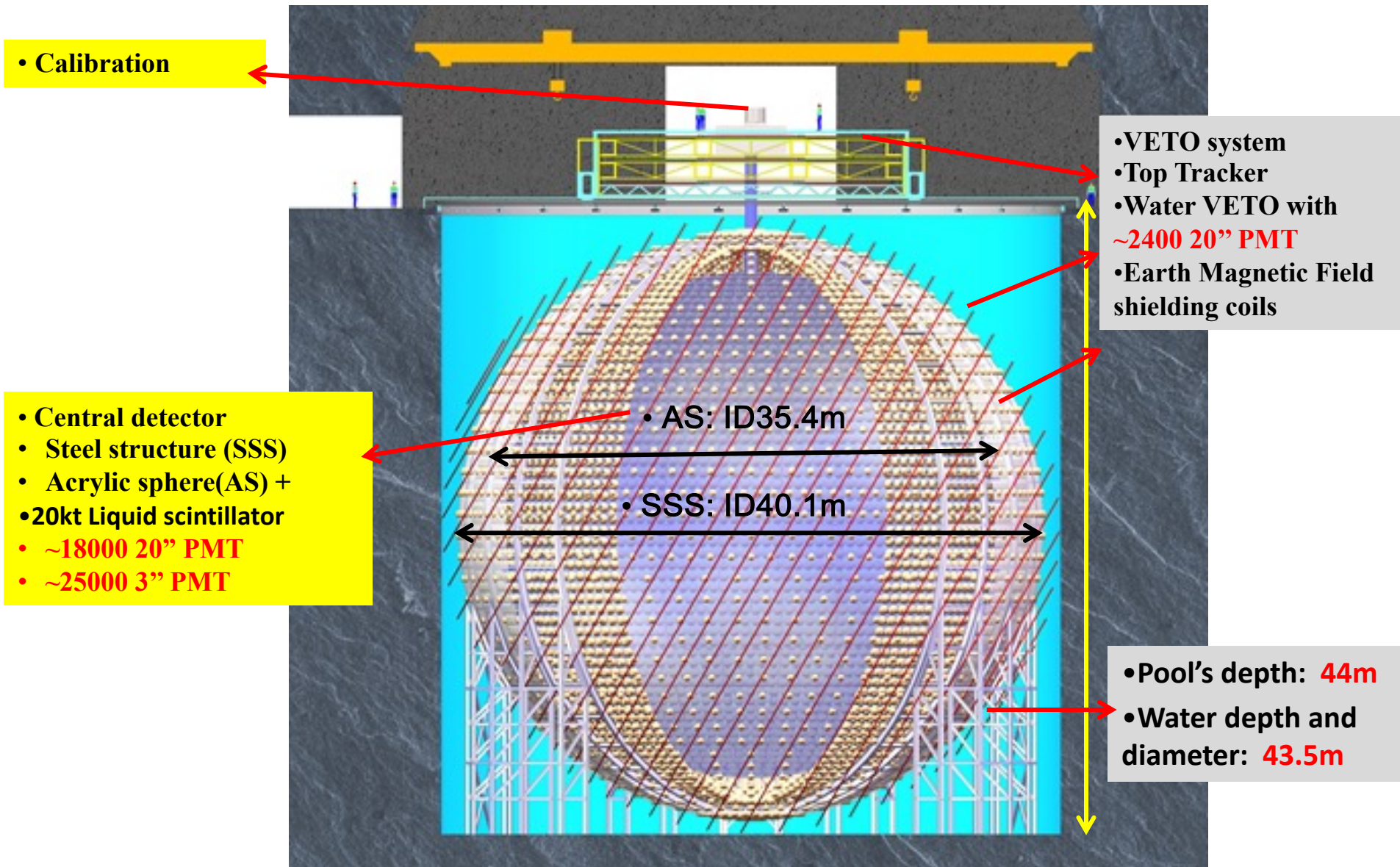


2. 信息及时调整开挖方式并修正相关设计参数。
3. 洞室顶部控制线可以用水泥砂浆等做控制线。

TIPP2023, September 04, 2023, Cape Town



JUNO Detector Key Parameters



Underground Halls

- ◆ Rock temperature $\sim 31^{\circ}\text{C}$, Exp. hall reduced and controlled to $\sim 21^{\circ}\text{C}$
- ◆ VAC provided fresh air of $40 \text{ km}^4/\text{hour}$ for underground cavern.
- ◆ Cleanness control

Experimental hall



Assembly hall



LS hall



HVAC & Ventilation

- Water pool HDPE(High Density PE) liner, thickness of 5mm



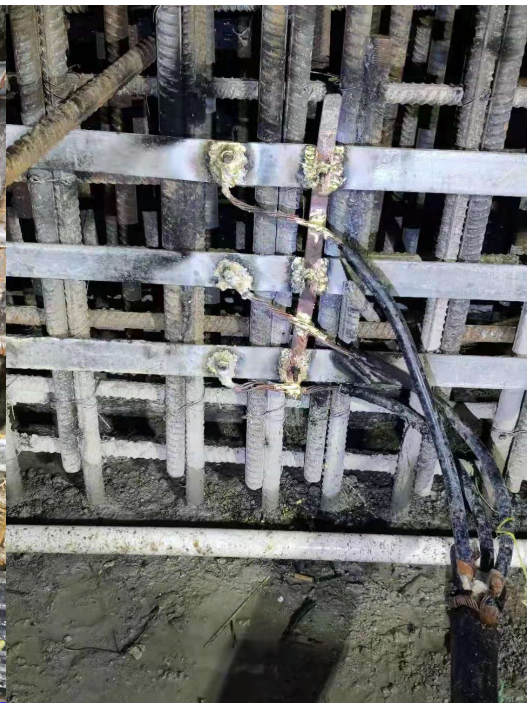


Experimental power/ground system

- Experimental power/ground is provided for sensitive equipment
- Experimental power (aka clean) is isolated from utility power by **isolation transformer** to avoid the noises from powerful utility equipment
- Experimental ground is an independent from utility ground. It will be implemented locally
- Experimental power/ground provided for
 - Surface Assembly Building (SAB), 100 kW
 - Underground electronics rooms: 500kW each

JUNO Underground Clean Power/ground

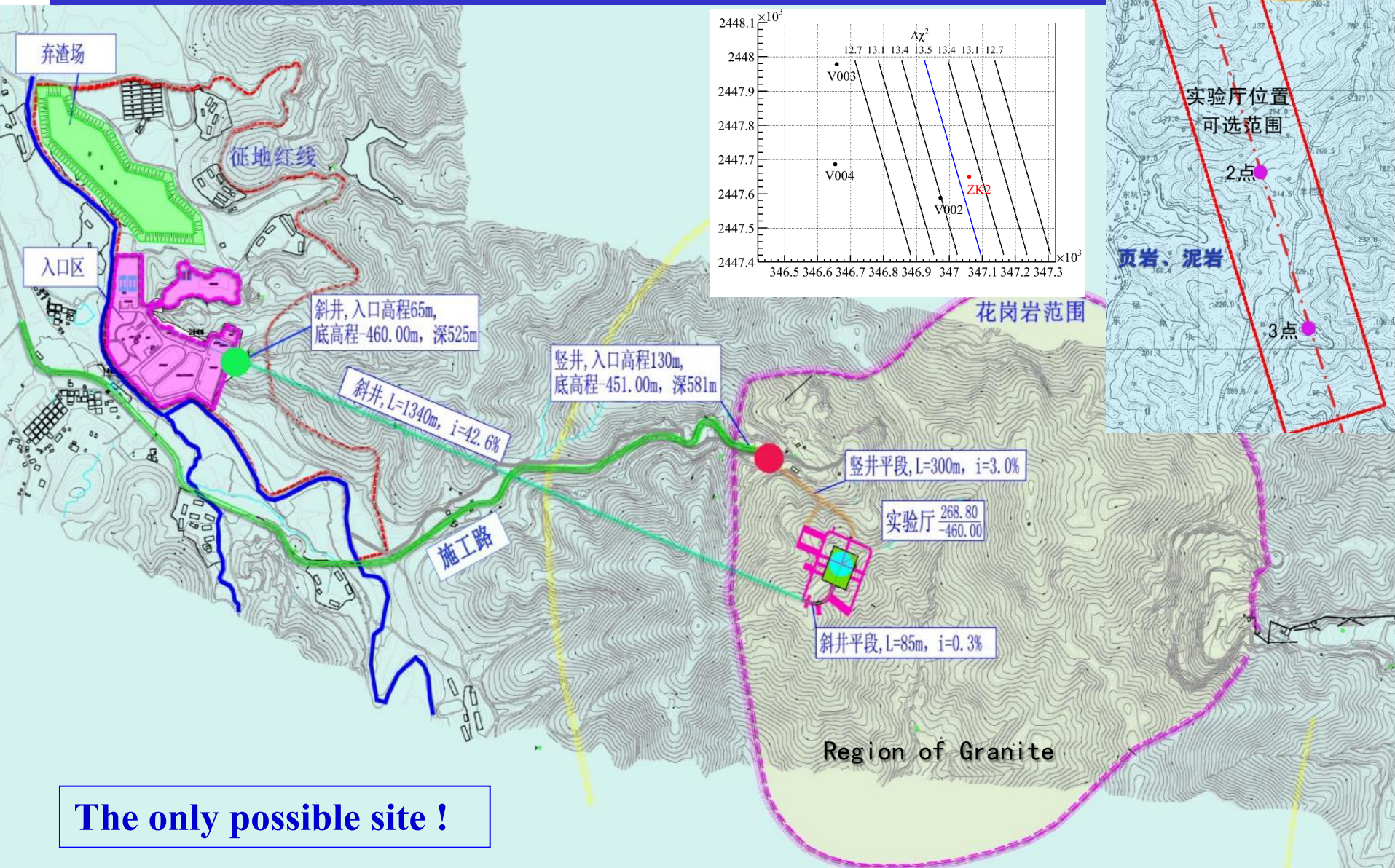
- Isolation transformers (300 kW) installed in electronics rooms each
- Underground clean ground was implemented by steel strips inside concrete of water pool, which is connected to copper net underneath electronics room, all of them form clean ground



- **The facility was delivered to experiment for experimental installation in 2021.**
 - **See, Ms. Ma' talk, Construction of the JUNO Detector**

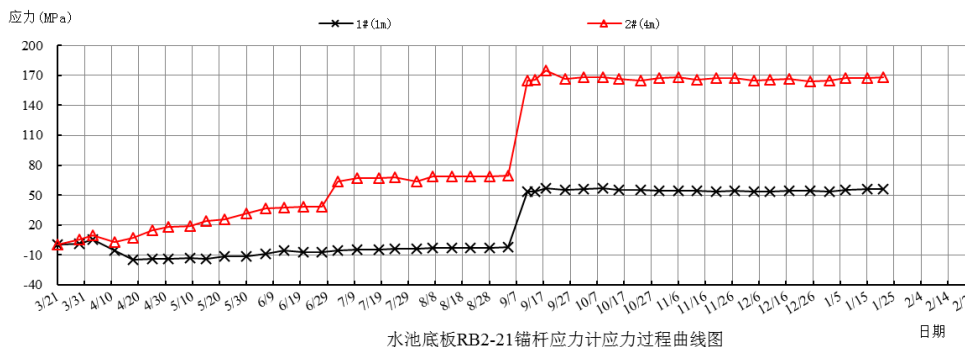
THANKS

Site Selection

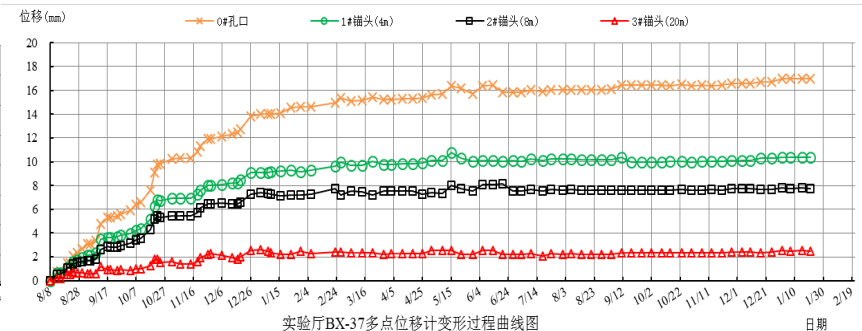


- **Stability monitoring of cavern structure**
 - **Number of monitoring sensors: 156**

	Displacement sensor	Rebar strain sensor	Cable strain sensor	Water pressure
Experimental hall	12	23	4	3
Water pool	21	58	8	19
Installation hall	3	3		



Rebar strain



Displacement