JUNO update

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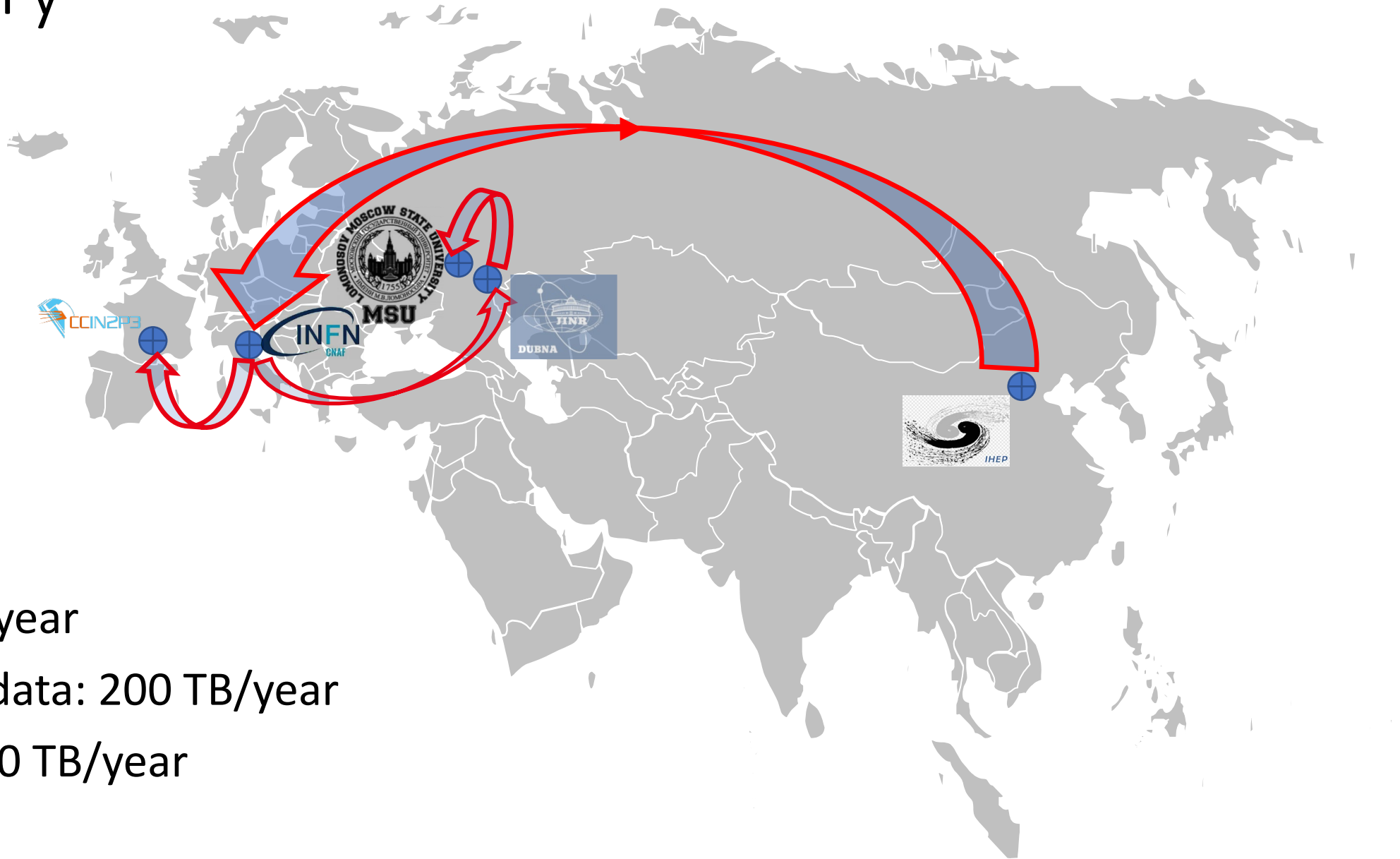
LHCOPN-LHCONE meeting #50

April 18, 2023

Jiangmen Underground Neutrino Observatory summary



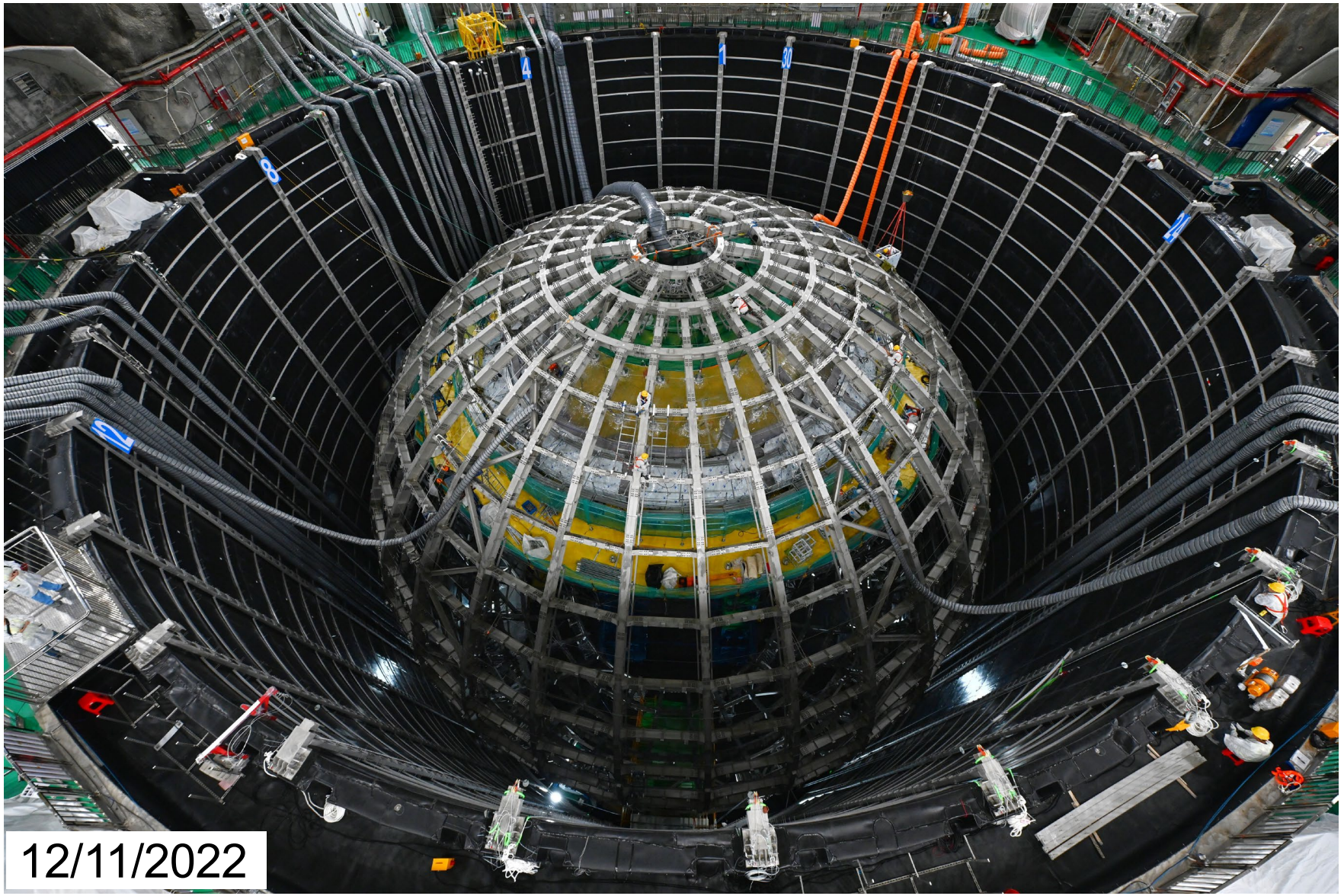
Data volume

- Raw data: 2PB/year
- Reconstructed data: 200 TB/year
- Analysis data: 20 TB/year

JUNO experiment update

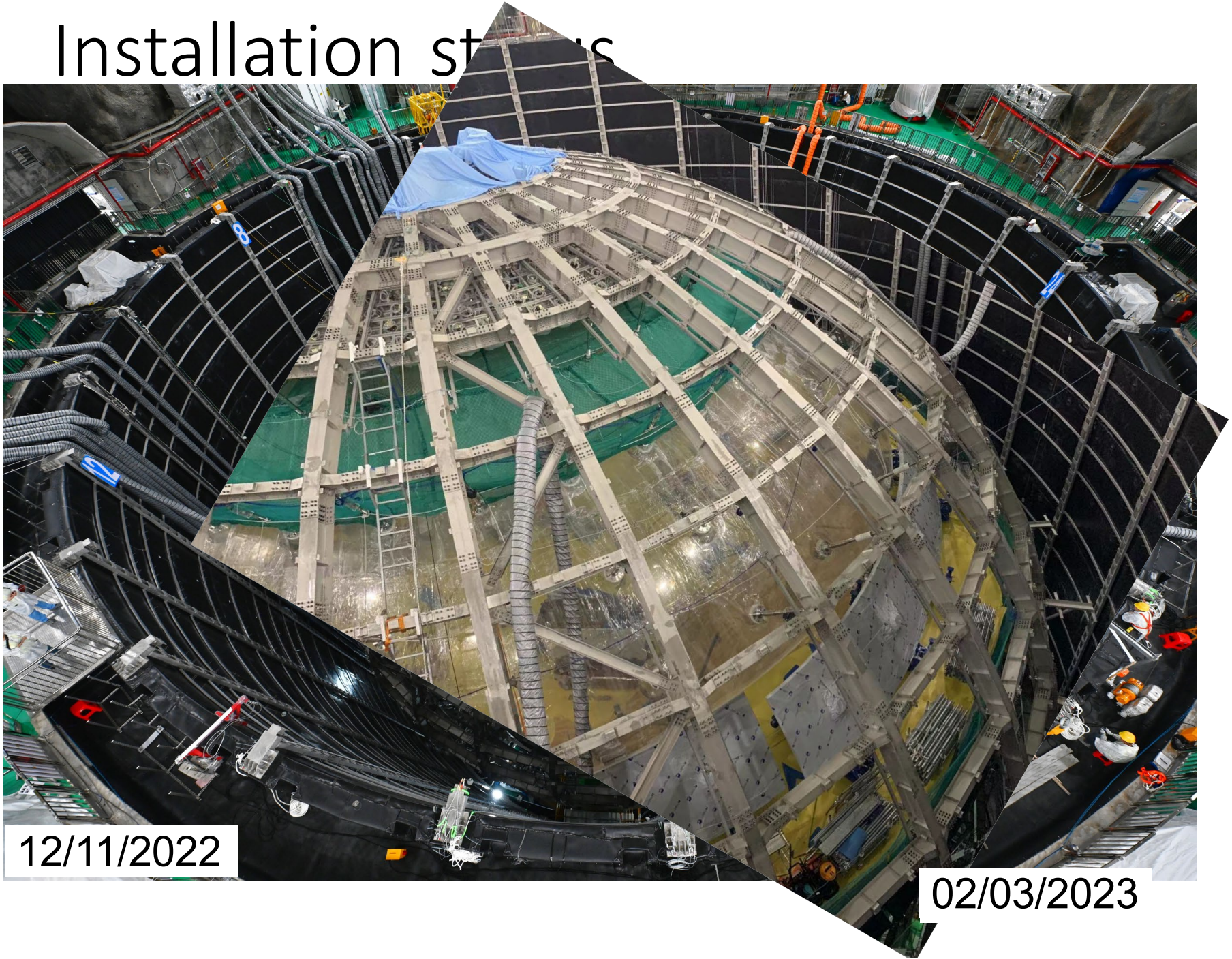
- Mounting at JUNO site is going on well
- Every day about 250 people at work on the several parts, on a tight schedule
- Data taking start is foreseen in 2024 first months

Installation status



- Water pool liner: installed
- Supporting structure: installed
- Acrylic panels: being installed!

Installation st[illegible]s



- Water pool liner: installed
- Supporting structure: installed
- Acrylic panels: being installed!
- PMTs and electronics: being installed!

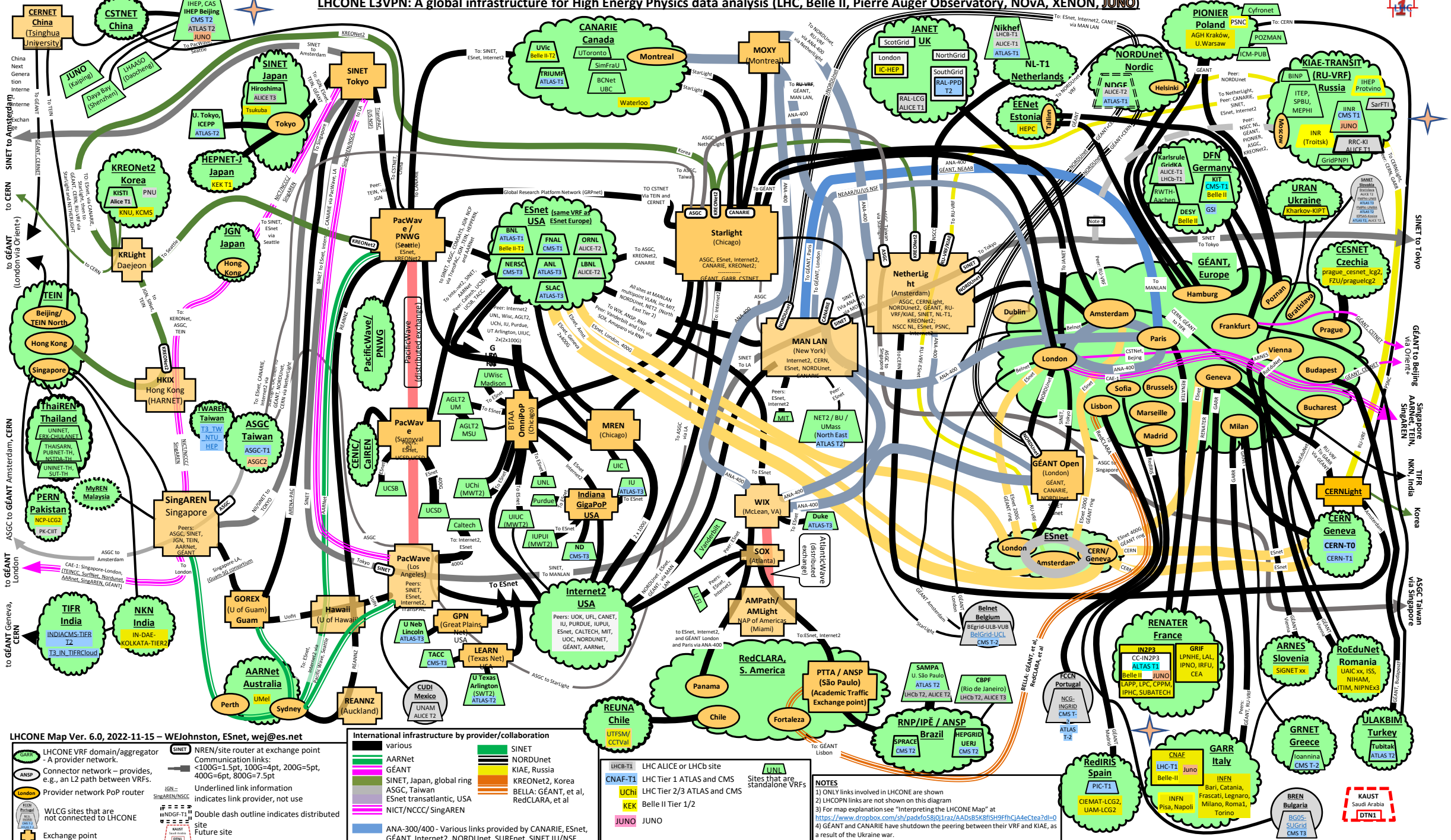
JUNO DCI

- JUNO Distributed Infrastructure is working well
- Usage and data transfers are increasing
- Training in progress, already 3 events done and a fourth is planned
- We are working to migrate from X509 to tokens
- In progress to participate to data challenge 2024

Network

- JUNO sites connected to LHCONE
- Connections to Russian sites (JINR, MSU): no on LHC but, in some way, working
- Fixed several misconfigurations impacting on TPC, now working quite well
  - Remain to fix a communiation problem between EOS and STORM for which tickets were submitted

LHCONE L3VPN: A global infrastructure for High Energy Physics data analysis (LHC, Belle II, Pierre Auger Observatory, NOvA, XENON, JUNO)



LHCONE Map Ver. 6.0, 2022-11-15 – WEJohnston, ESnet, wej@es.net

- LHCONE VRF domain/aggregator - A provider network.
- Connector network – provides, e.g., an L2 path between VRFs.
- Provider network PoP router
- WLCG sites that are not connected to LHCONE
- Exchange point
- NREN/site router at exchange point
- Communication links: <100G=1.5pt, 100G=4pt, 200G=5pt, 400G=6pt, 800G=7.5pt
- Underlined link information indicates link provider, not use
- Double dash outline indicates distributed site
- Future site

International infrastructure by provider/collaboration

- various
- AARNet
- GÉANT
- SINET, Japan, global ring
- ASGC, Taiwan
- ESnet transatlantic, USA
- NICT/NCCC/ SingAREN
- SINET
- NORDUnet
- KIAE, Russia
- KREONet2, Korea
- BELLA: GÉANT, et al, RedCLARA, et al
- ANA-300/400 - Various links provided by CANARIE, ESnet, GÉANT, Internet2, NORDUnet, SURFnet, SINET,IU/NSF

- LHCB-T1 LHC ALICE or LHCb site
- CNAF-T1 LHC Tier 1 ATLAS and CMS
- UChi LHC Tier 2/3 ATLAS and CMS
- KEK Belle II Tier 1/2
- JUNO JUNO
- UNL Sites that are standalone VRFs

NOTES

1) ONLY links involved in LHCONE are shown
2) LHCOPN links are not shown on this diagram
3) For map explanation see "Interpreting the LHCONE Map" at https://www.dropbox.com/sh/padxfo58j0j1raz/AADsB5K8fiSH9FfhCjA4eCtea?dl=0
4) GÉANT and CANARIE have shutdown the peering between their VRF and KIAE, as a result of the Ukraine war.

Network challenges

Network challenge 2021/22

- Measurements made in different times, when teams in different data centers matched
- Sometimes, when results where too much poor, some fine tuning work on network was needed
- In green, couple of data centers important in the data flow proposal
  - JUNO requires a minimum average badwidth of about 1.00 Gbps

Source	Destination	Date	Result
CNAF	IHEP	22/03/2022	3.00
IHEP	CNAF	22/03/2022	1.60
CC-IN2P3	CNAF	19/04/2022	7.00
CC-IN2P3	IHEP	19/04/2022	1.69
CC-IN2P3	JINR	19/04/2022	2.13
CNAF	CC-IN2P3	19/04/2022	10.00
IHEP	CC-IN2P3	19/04/2022	1.65
IHEP	JINR	02/06/2022	1.00
JINR	IHEP	02/06/2022	0.75
CNAF	JINR	06/06/2022	10.00
JINR	CNAF	06/06/2022	4.00
JINR	CC-IN2P3	11/07/2022	4.00
CNAF	MSU	15/07/2022	0.50
MSU	CNAF	15/07/2022	0.90

Network challenge 2022/23

- Two people, Andrea Rendina at CNAF and Xuantong Zhang at IHEP, in charge of performing measurements in coordination with data centres
- Measurements made in different times
- Sometimes, when results where too much poor, some fine tuning work on network was needed
- In green, couple of data centers important in the data flow proposal
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CC-IN2P3	IHEP	13/12/2022	6.00
CC-IN2P3	JINR	07/03/2023	19.00
CNAF	CC-IN2P3	16/01/2023	15.00
IHEP	CC-IN2P3	13/12/2022	4.80
IHEP	JINR	13/12/2022	1.80
JINR	IHEP	13/12/2022	2.80
CNAF	JINR	23/01/2023	12.80
JINR	CNAF	24/01/2023	3.90
JINR	CC-IN2P3	08/03/2023	10.00
CNAF	MSU	11/04/2023	8.50
MSU	CNAF	11/04/2023	1.00

Improvements

2021/22

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2022/23

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MSU	CNAF	11/04/2023	1.00

What’s next

- We used iperf on storage frontends, in next test we will use iperf servers
- Working to have in perfmon servers pages from which to get data
- Integrating some network data in monitoring dashboard, yet under development

Summary

- JUNO central detector is actively under developmet, more or less in track with timeline
- JUNO DCI operational and disseminated inside the community
- Network is under assesment and monitoring
- Thanks to all data centres and their teams for prompt and active support

Thank you