

Prospects of the EIC Japan Group

TAKU GUNJI

CENTER FOR NUCLEAR STUDY

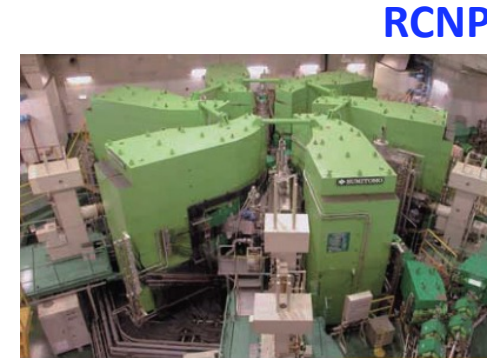
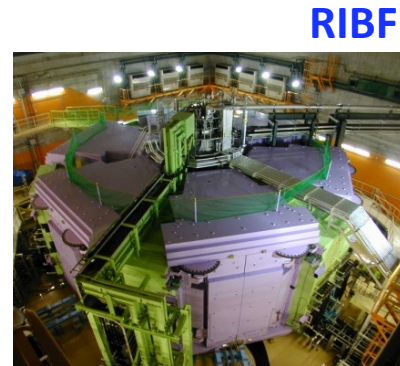
THE UNIVERSITY OF TOKYO



Japanese and Overseas Facilities

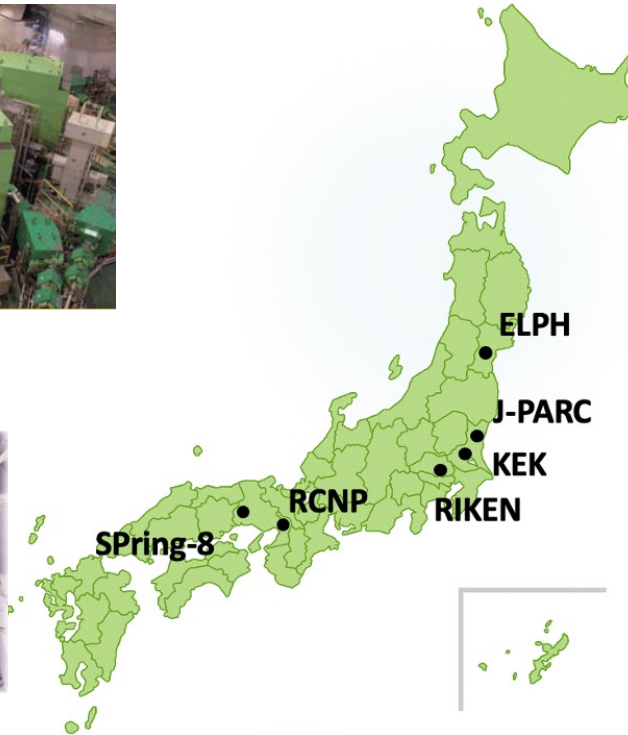
▶ Low Energy Nuclear Physics

- ▶ RIBF and RCNP
- ▶ ~200 researchers



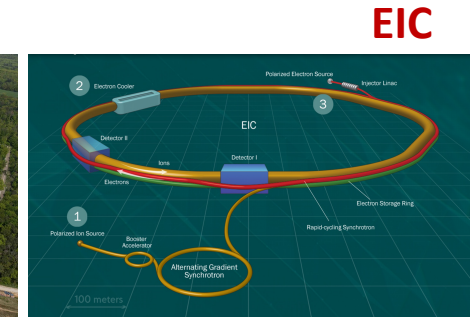
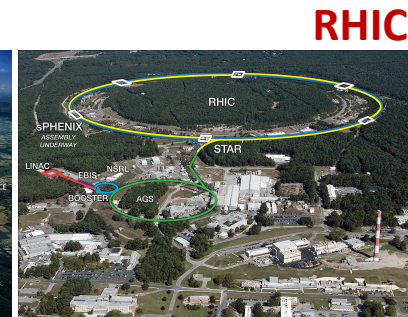
▶ Strangness and Hadron Physics

- ▶ J-PARC, Spring-8, and ELPH
- ▶ ~100 researchers



▶ High Energy QCD Physics

- ▶ LHC, RHIC, FAIR, EIC
- ▶ RIKEN BNL Center (RBRC)
- ▶ ~50 researchers



RIBF upgrade

▶ RIBF upgrade

▶ Intensity upgrade of heavy-ion LINAC (ongoing)

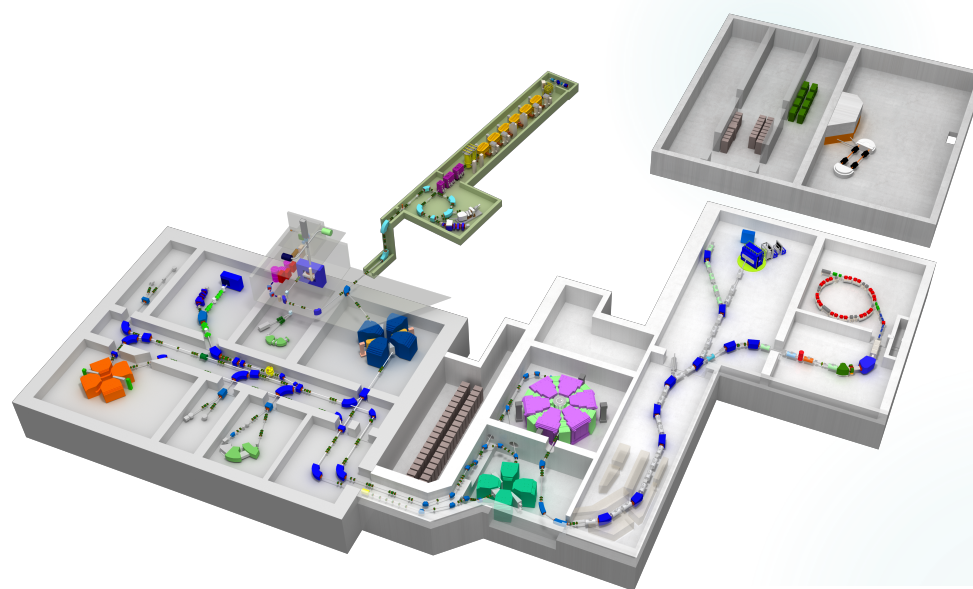
▶ Super-heavy element (119)

▶ ORNL-RIKEN Collaboration

▶ New Charge Stripper Rings

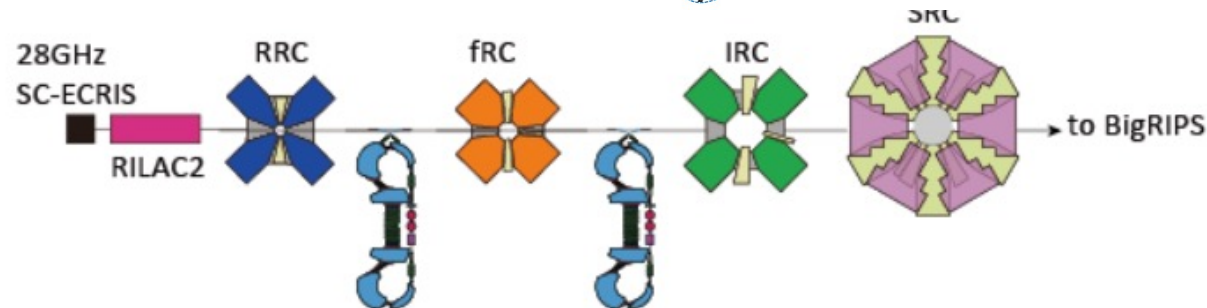
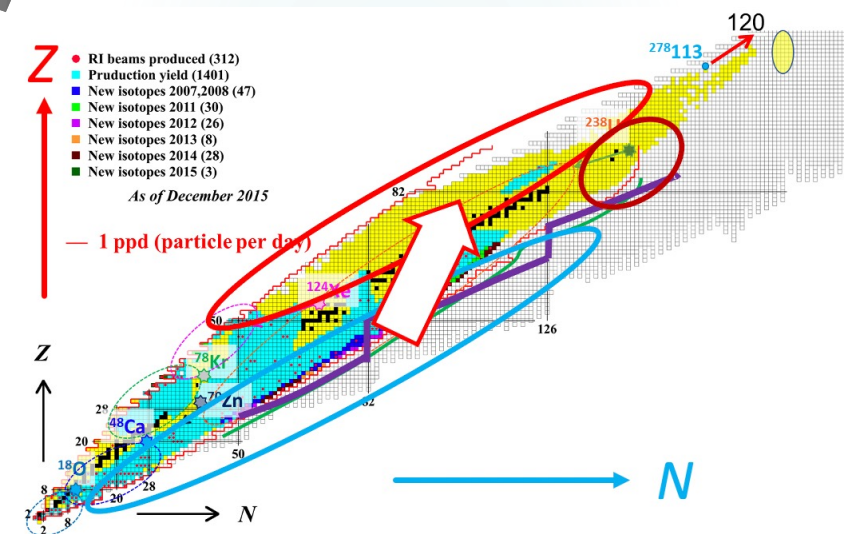
▶ ~\$150M (not funded)

▶ submitted to MEXT roadmap 2023



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Charge Stripper Rings (CSR) :
beam recycling to improve
transmission efficiency
($U^{35+} \rightarrow U^{64+}$) by x10-20



J-PARC Hadron facility extension

▶ J-PARC Hadron facility extension

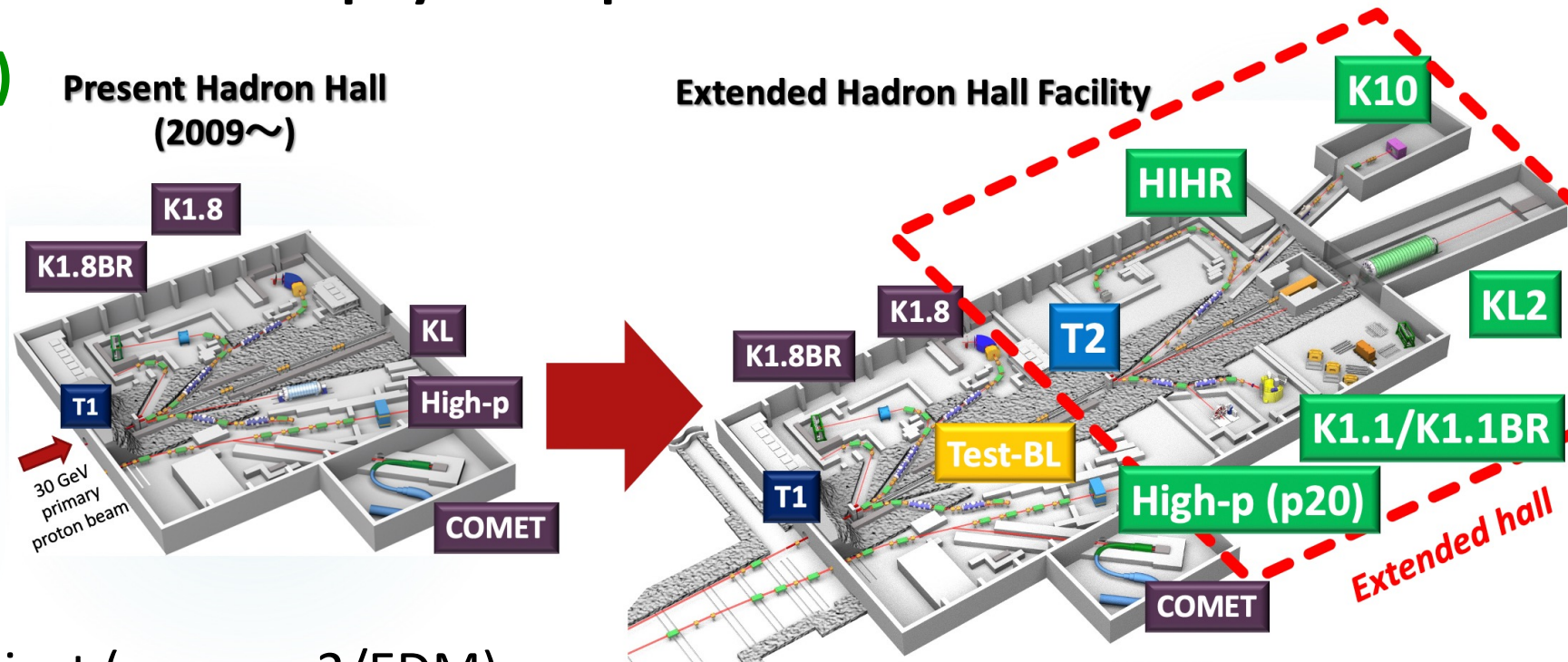
▶ Enrich the strangeness and hadron physics capabilities

▶ ~\$100M (not funded)

▶ Selected MEXT roadmap 2020

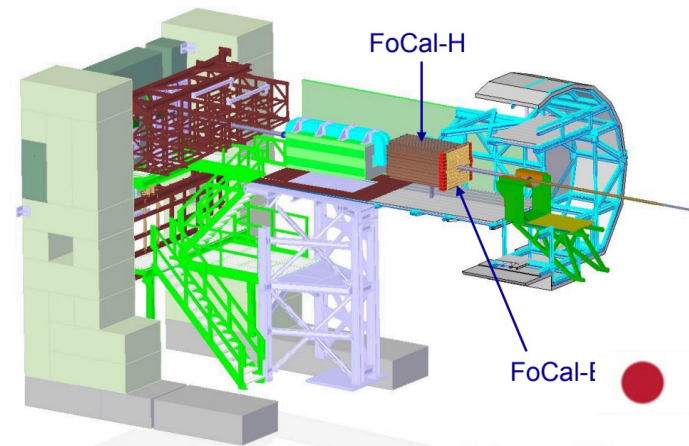
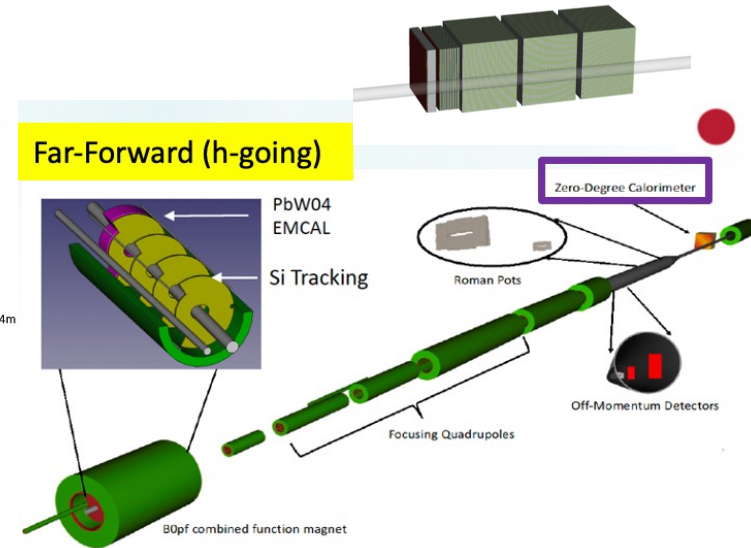
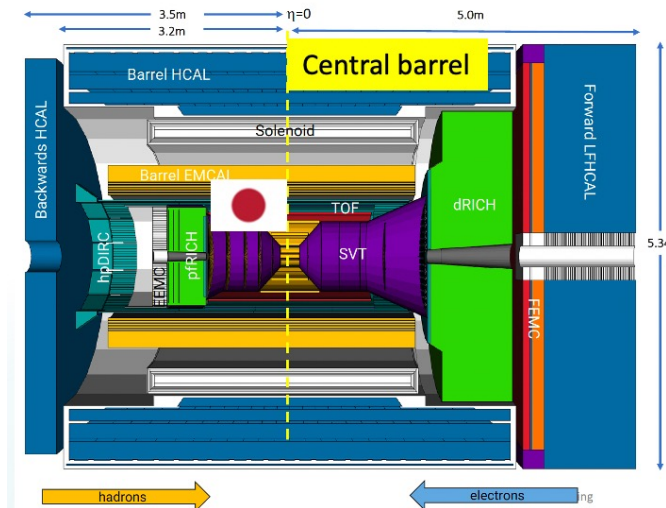
▶ Selected as the **top-priority project** in KEK's mid-term plan (FY2022-26)

▶ Last top-priority project (muon g-2/EDM) has not been yet budgeted.

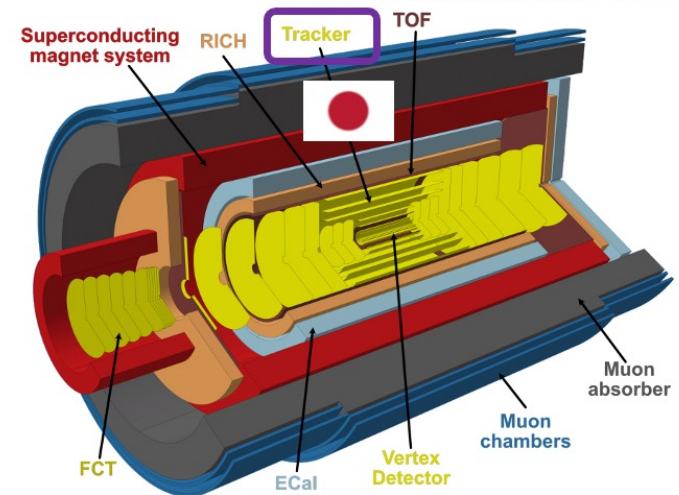


Plans for high-energy QCD physics

- ▶ **Focuses on ePIC and ALICE(3)**
- ▶ **Planned in-kind contributions**
 - ▶ **ePIC: ~\$30M (not funded)**
 - ▶ AC-LGAD for barrel TOF
 - ▶ ZDC (EMCal ~ ALICE FoCAL)
 - ▶ Streaming DAQ/Computing
 - ▶ **ALICE: ~\$30M (not funded)**
 - ▶ FoCAL
 - ▶ ~\$5M secured (grant-in-aid)
 - ▶ Outer MAPS Tracker



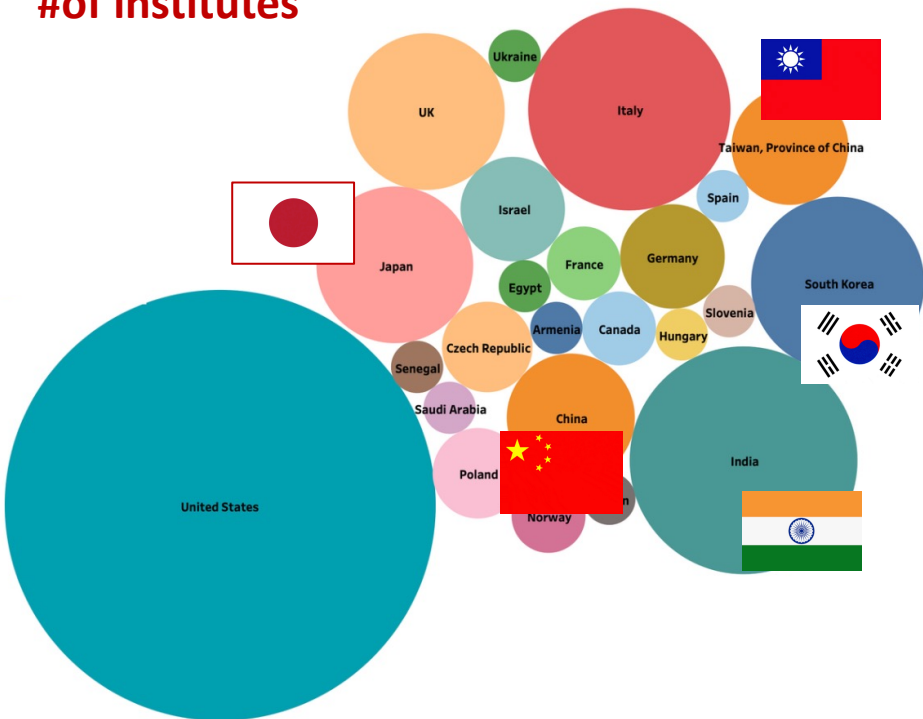
$3.4 < \eta < 5.8$
(baseline design @ 7m from IP)



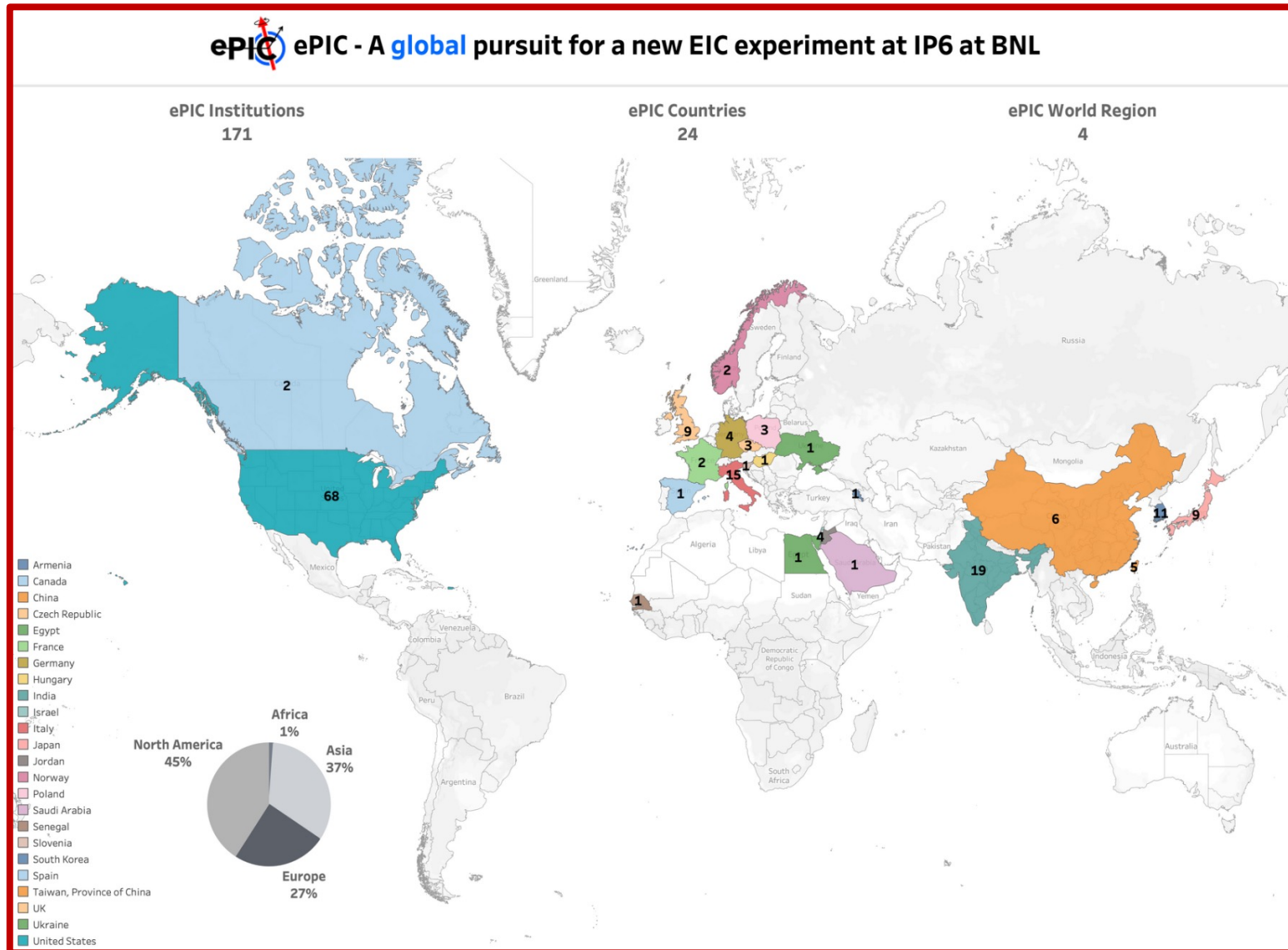
Two proposals submitted to MEXT Roadmap 2023

ePIC Experiment and Japan

#of institutes

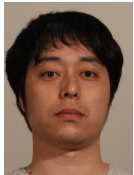


50 institutes (30%) are from Asia.
9 (10?) institutes from Japan

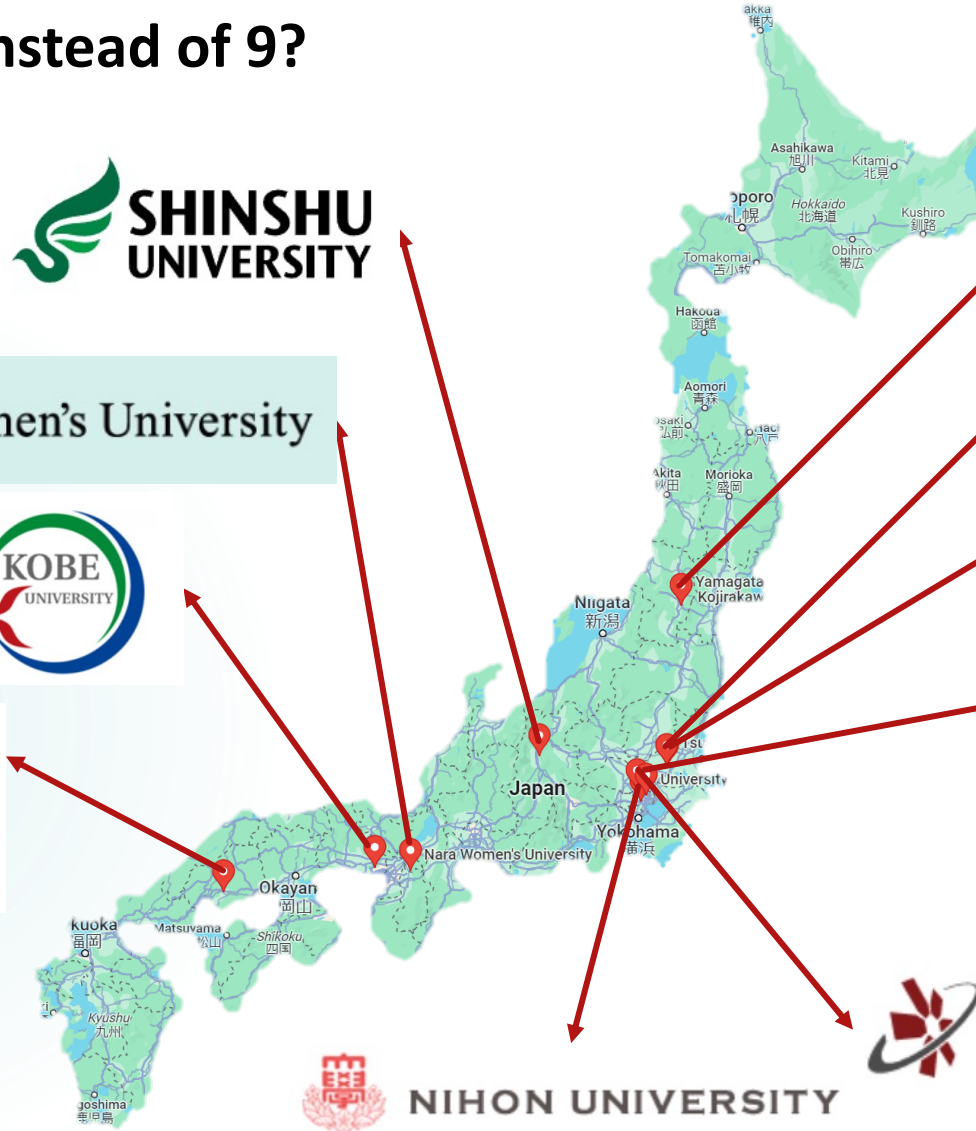


Japanese Institutes in ePIC

▶ 10 institutes instead of 9?



S. Yano, TOF-DSC

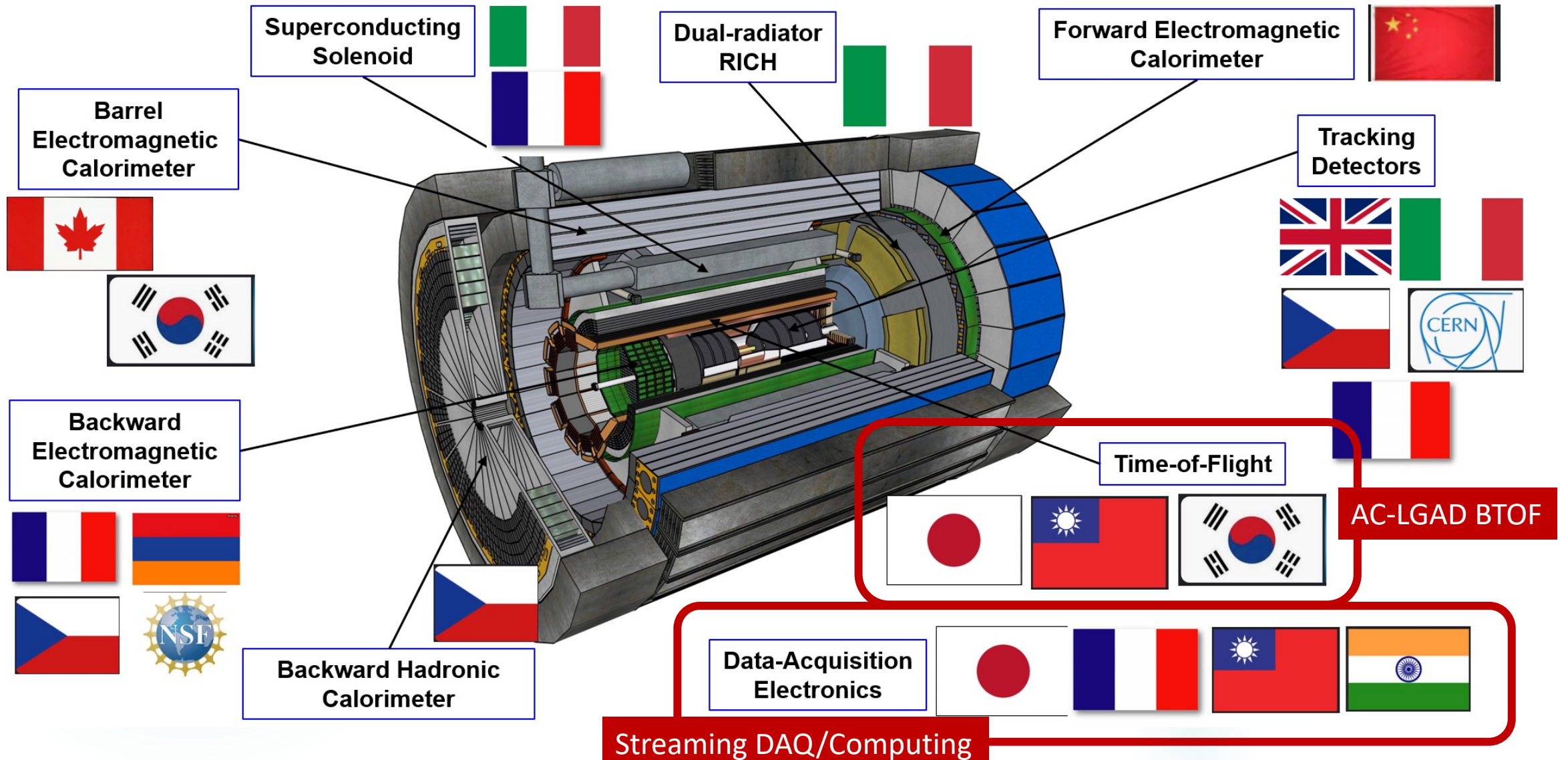


T. Gunji, Executive Board member

Y. Goto, ZDC DSTC



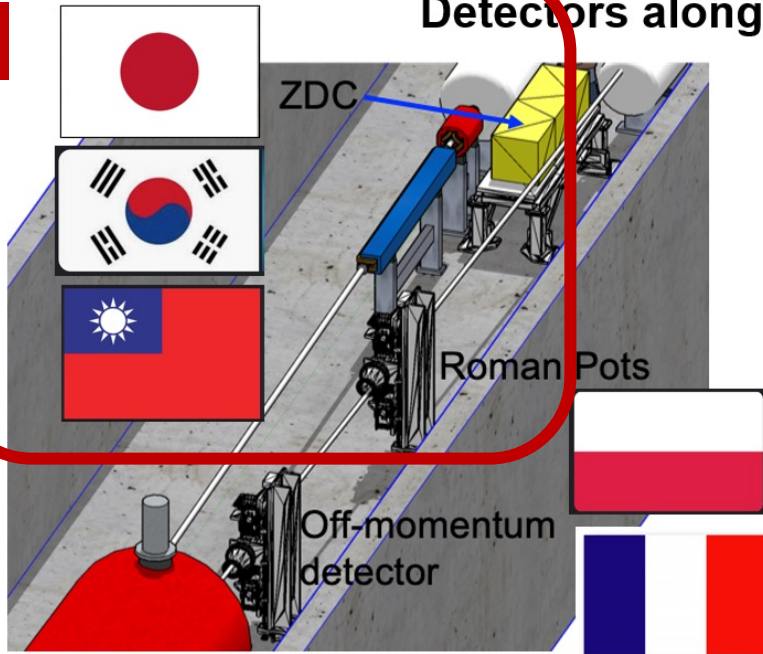
Japanese activities in ePIC



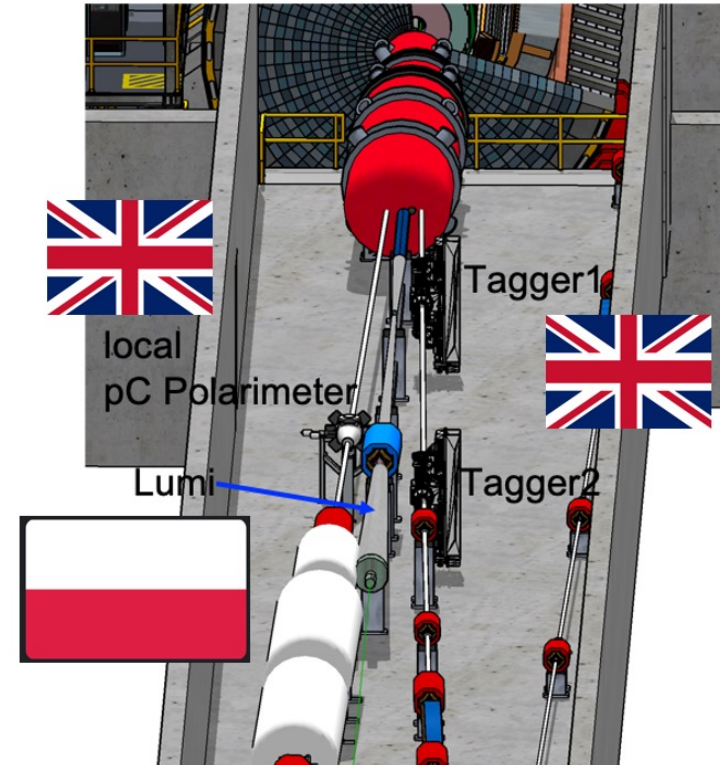
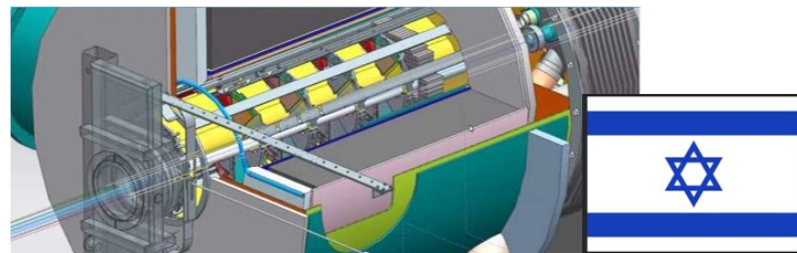
Japanese activities in ePIC

Detectors along the hadron and electron beam-lines

ZDC



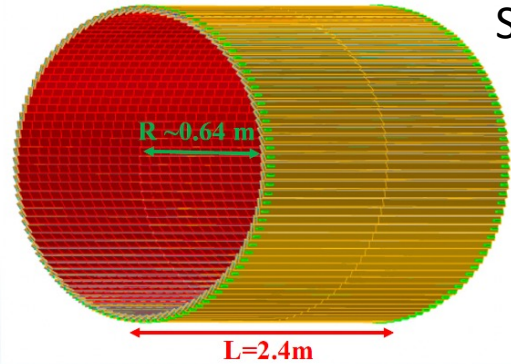
B0-Tracker & Electromagnetic Calorimeter



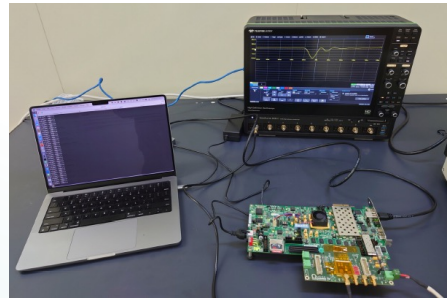
Japanese activities in ePIC

▶ AC-LGAD (S. Yano and K. Shigaki)

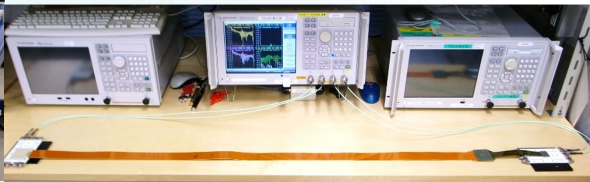
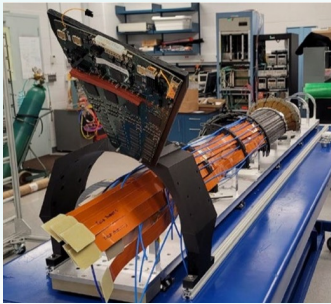
Barrel TOF:



Sensor test setup (Hiroshima)



Bus extender for INTT in sPHENIX (RIKEN & Nara)

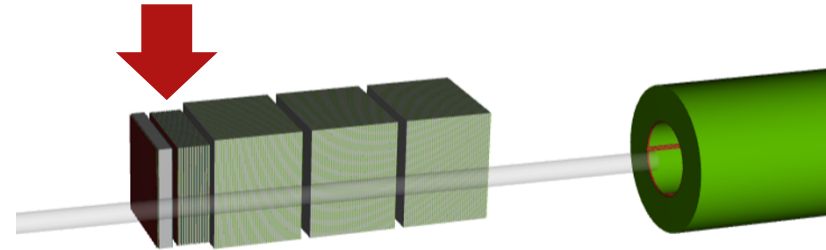


• Japan

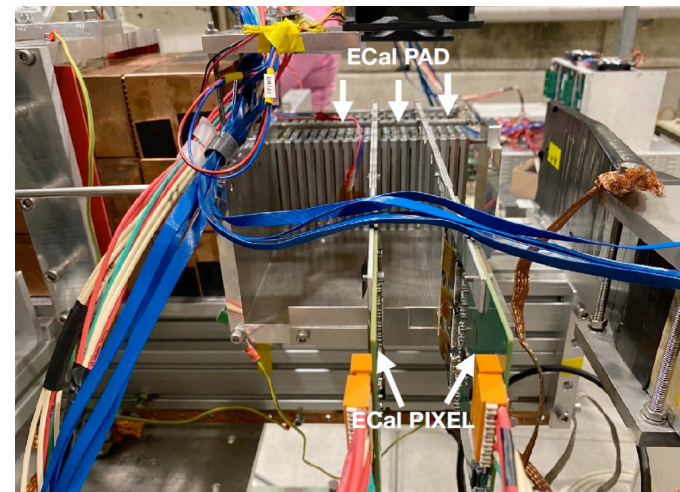
- ★ Hiroshima University (AC-LGAD, Frontend ASIC, Sensor-ASIC integration, Simulation)
- ★ Nara Woman's University (Frontend ASIC, Module Assembly, Stave Assembly)
- ★ RIKEN (Module Assembly, Stave Assembly)
- ★ Shinshu University (AC-LGAD, Frontend ASIC)
- ★ University of Tokyo (DAQ, Streaming readout, Online reconstruction)

▶ ZDC (Y. Goto)

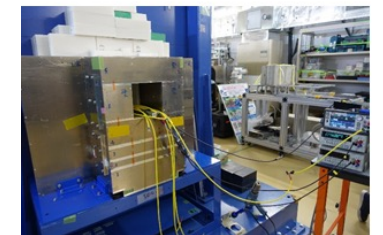
W+Si pad Layers as option of the ZDC baseline
Synergies with ALICE-FoCAL



ALICE-FoCAL beam test@CERN



Neutron irradiation at RIKEN RANS

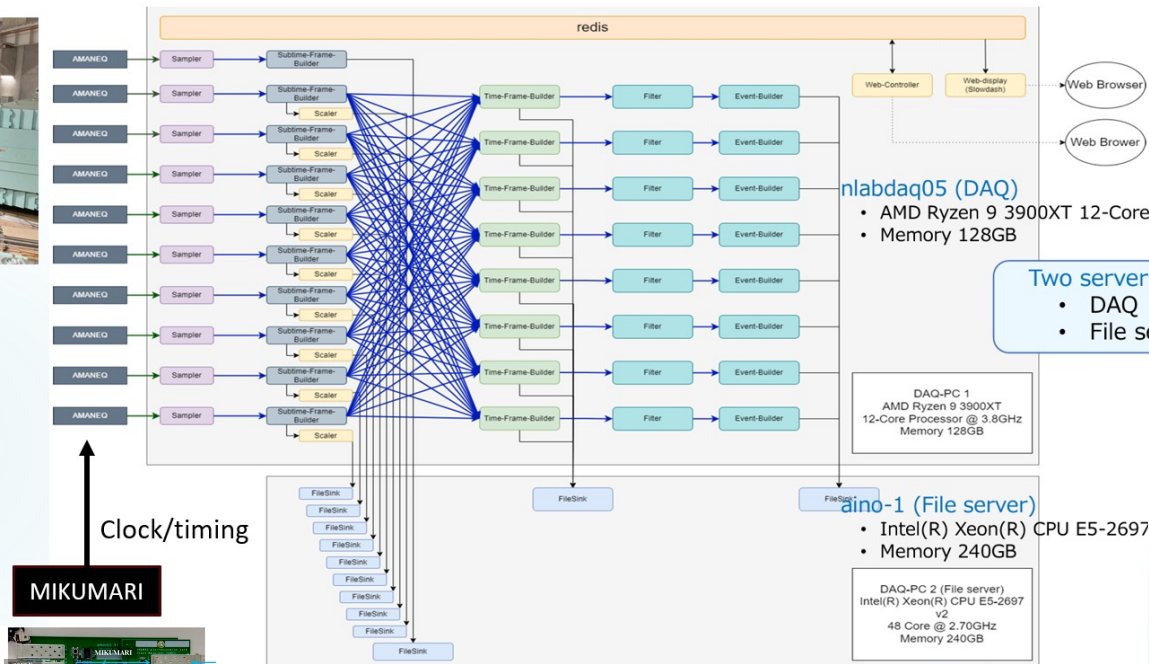


Japanese activities in ePIC

▶ Streaming DAQ/Computing

▶ Details at the last collaboration meeting by T. Gunji

▶ SPADI-Alliance in Japan for the standardization of SRO DAQ in many facilities.

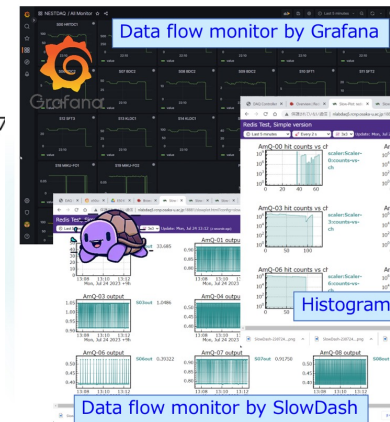


Joint workshop and SRO XI WS at Hawaii (2023)



Two server PC configuration

- DAQ
- File server



Histogram view by SlowDash

DAQ controller

RUN number

State transition command

State Summary

Source	Destination	Ready	Busy	Standby	Count	Ready	Busy	Standby	Count
AmnQ-01	AmnQ-02	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-02	AmnQ-03	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-03	AmnQ-04	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-04	AmnQ-05	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-05	AmnQ-06	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-06	AmnQ-07	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-07	AmnQ-08	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00
AmnQ-08	AmnQ-09	30	0	0	2023-03-01 10:00:00	30	0	0	2023-03-01 10:00:00

Select command target

nestDAQ (network based streaming DAQ)

Using nestDAQ at JLab under discussion
Discussion on Echelon2 with RCNP, Osaka

Financial situation

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- ▶ Currently, no budgets dedicated to the EIC ...
- ▶ Grants-in-Aid for Scientific Research
 - ▶ Promotion of Joint International Research (International Leading Research) [JSPS]
 - ▶ \$3.5M/7-10 years -> will be applied (if passed, grant will be from 1.2025)
 - ▶ Transformative Research Areas (A) [MEXT]
 - ▶ \$10M/5years/~5 projects -> will be applied (if passed, grant will be from 4.2025)
 - ▶ Adopting Sustainable Partnerships for Innovative Research Ecosystem (ASPIRE) [JST]
 - ▶ \$ 3.5M/5 years -> will be applied (if passed, grant will be from 1.2025)
- ▶ Specially Promoted Research (\$3.5M/5years)
- ▶ Scientific Research(S - \$1.3M/5year)(A - \$0.4/4-5years)(B,)...



JSPS = Japan Society for the Promotion of Science

MEXT = Ministry of Education, Culture, Sports, Science and Technologies – Japan

JST = Japan Science and Technology Agency

Financial situation

- ▶ Another channel not to rely on the Grants-in-Aid.
- ▶ **“Budgetary Request” from research institute and Universities to the MEXT**

Please contact me in case you are interested in...