Highlights of SRF2023 conference at Grand Rapids in USA

2023, October 24th

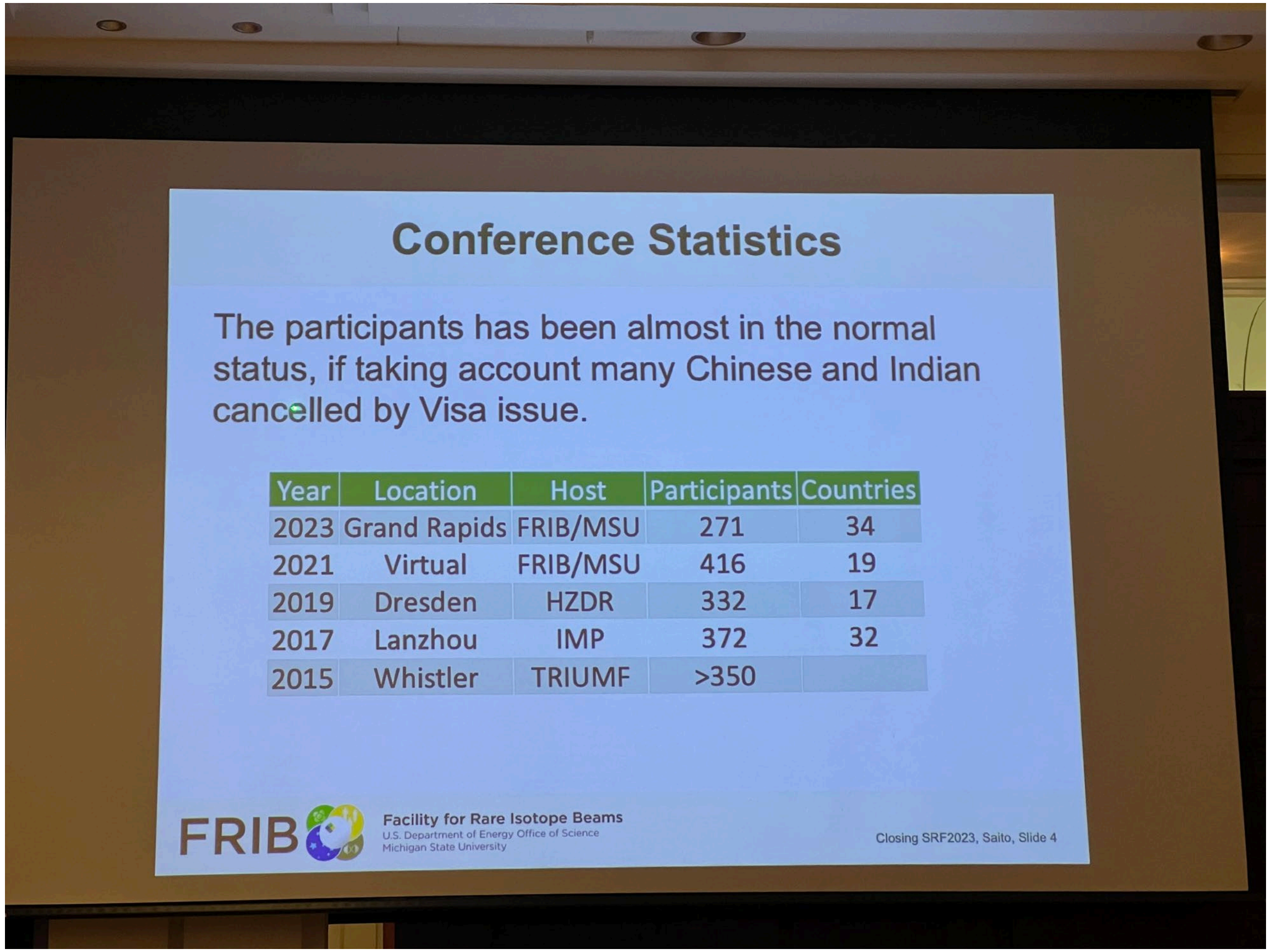
Eiji Kako (KEK)

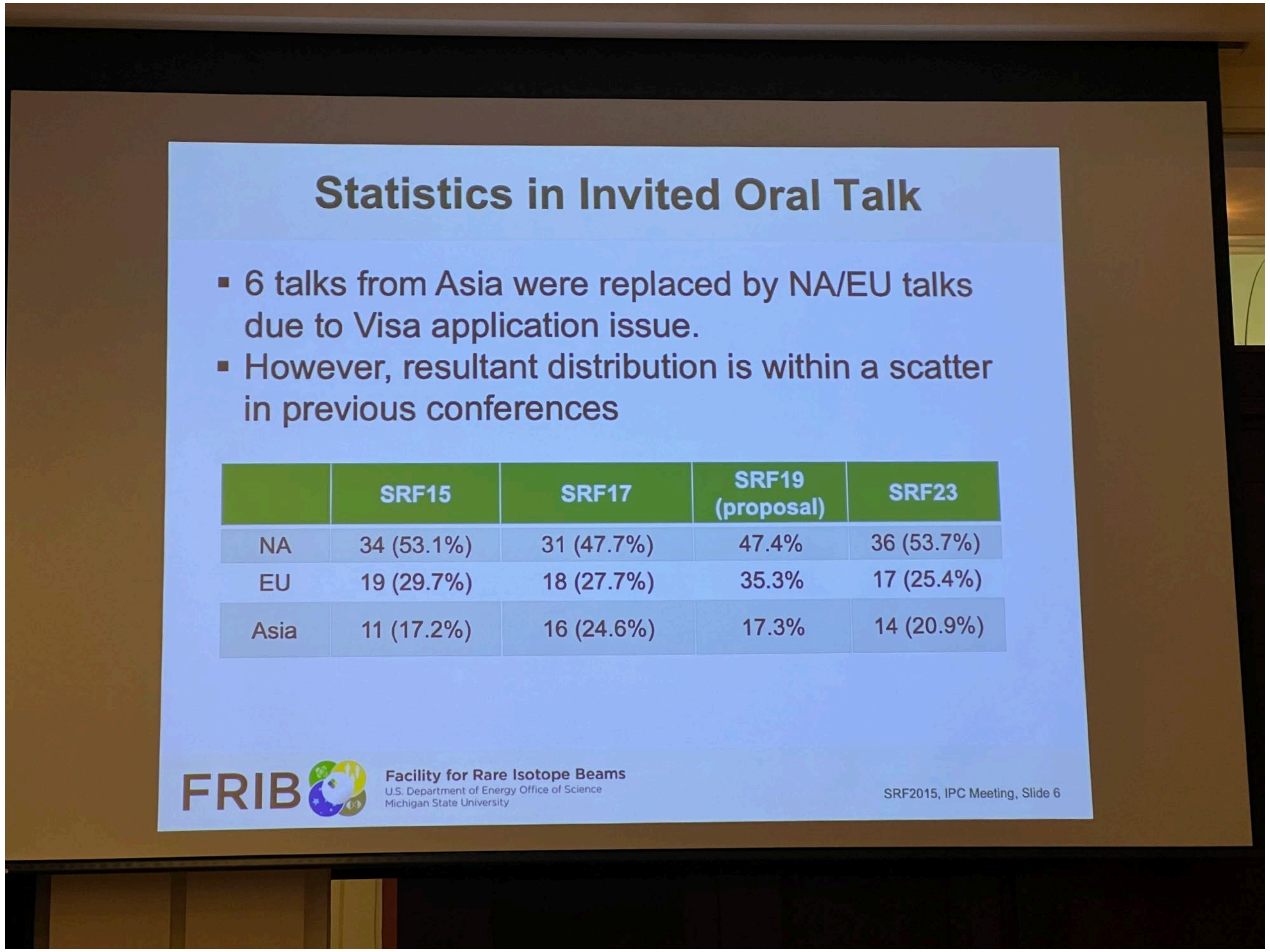
Outline

1. Overview of SRF2023 Conference
2. SRF Accelerator Facilities
3. SRF Technologies
4. Future Meeting Related to SRF Systems

SRF2023 at Grand Rapids

Participants in SRF2023





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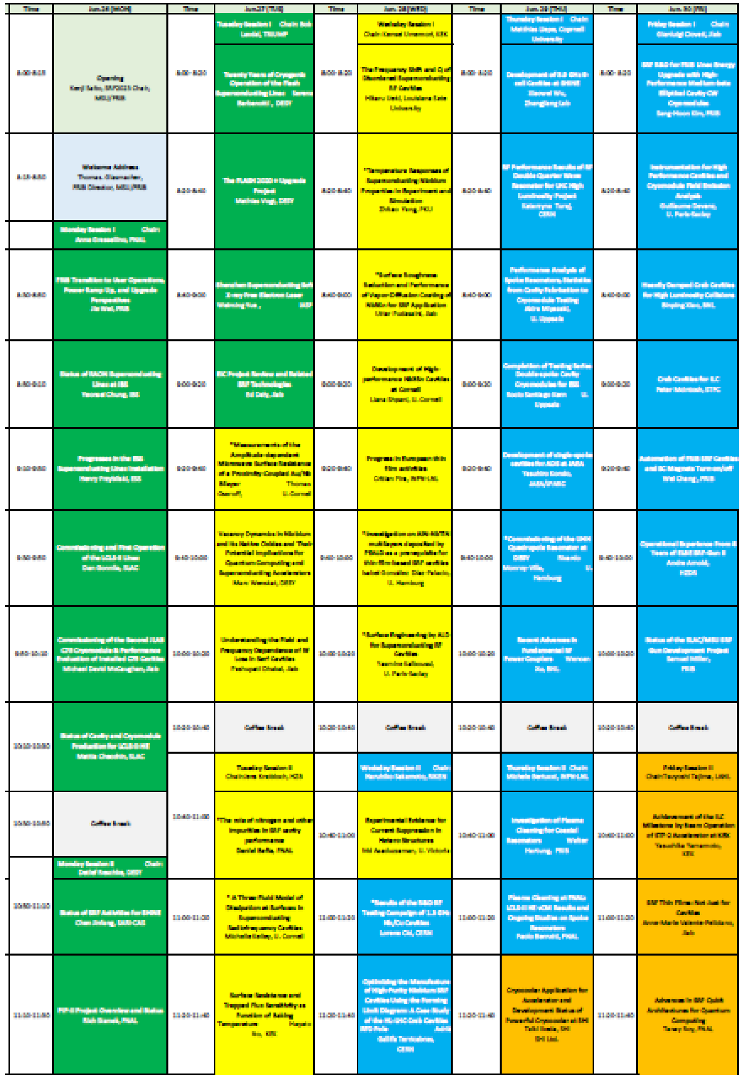
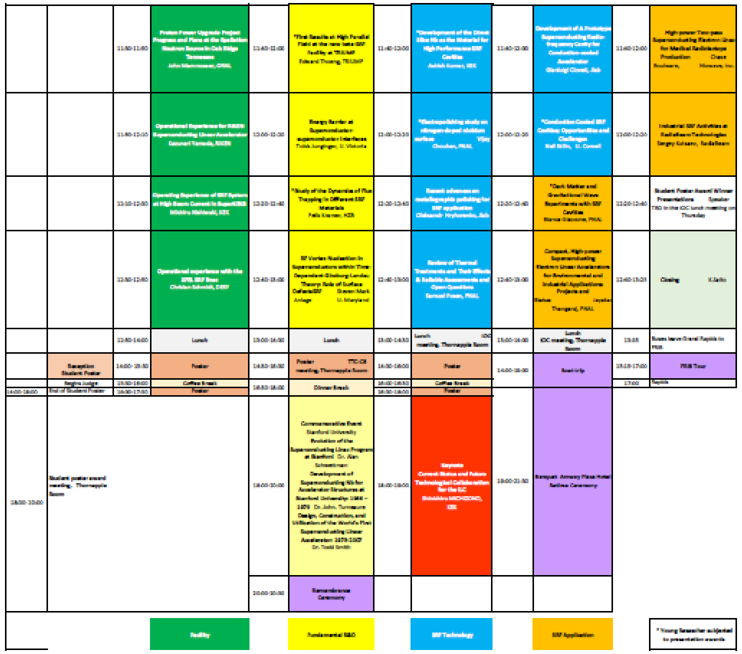
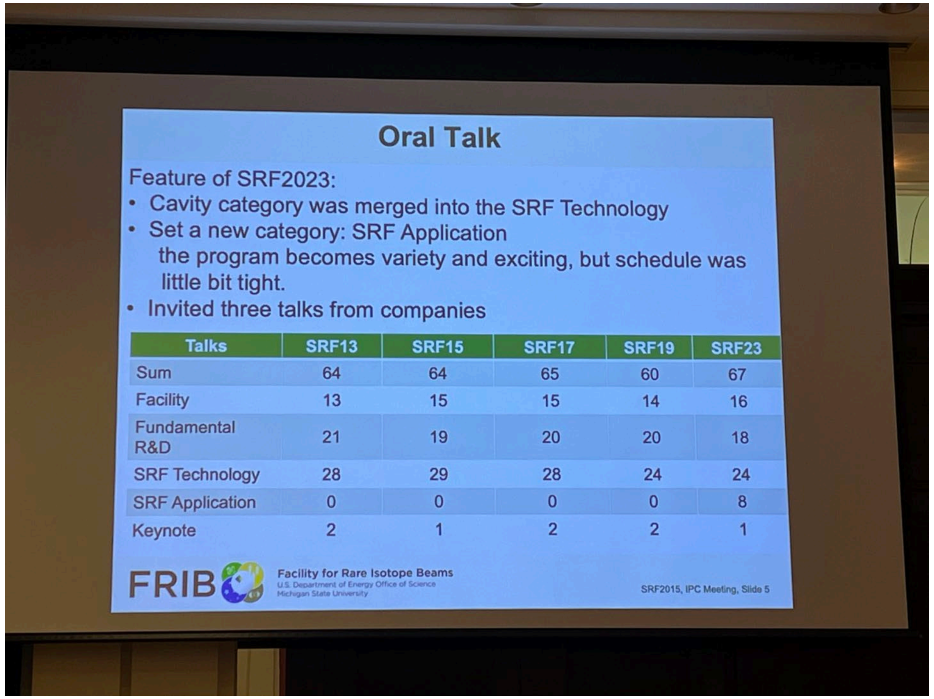
応用超伝導加速器イノベーションセンター

Program of SRF2023







- Facility (16)
- Fundamental R&D (18)
- SRF Technology (24)
- SRF Application (8)
- Keynote (1)

Total 67 Invited Oral Talks

Oral Session of Invited Talks

Proceedings of SRF2023

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[SRF2023 Home-page](https://srf2023.vrws.de/index.html)
https://srf2023.vrws.de/index.html

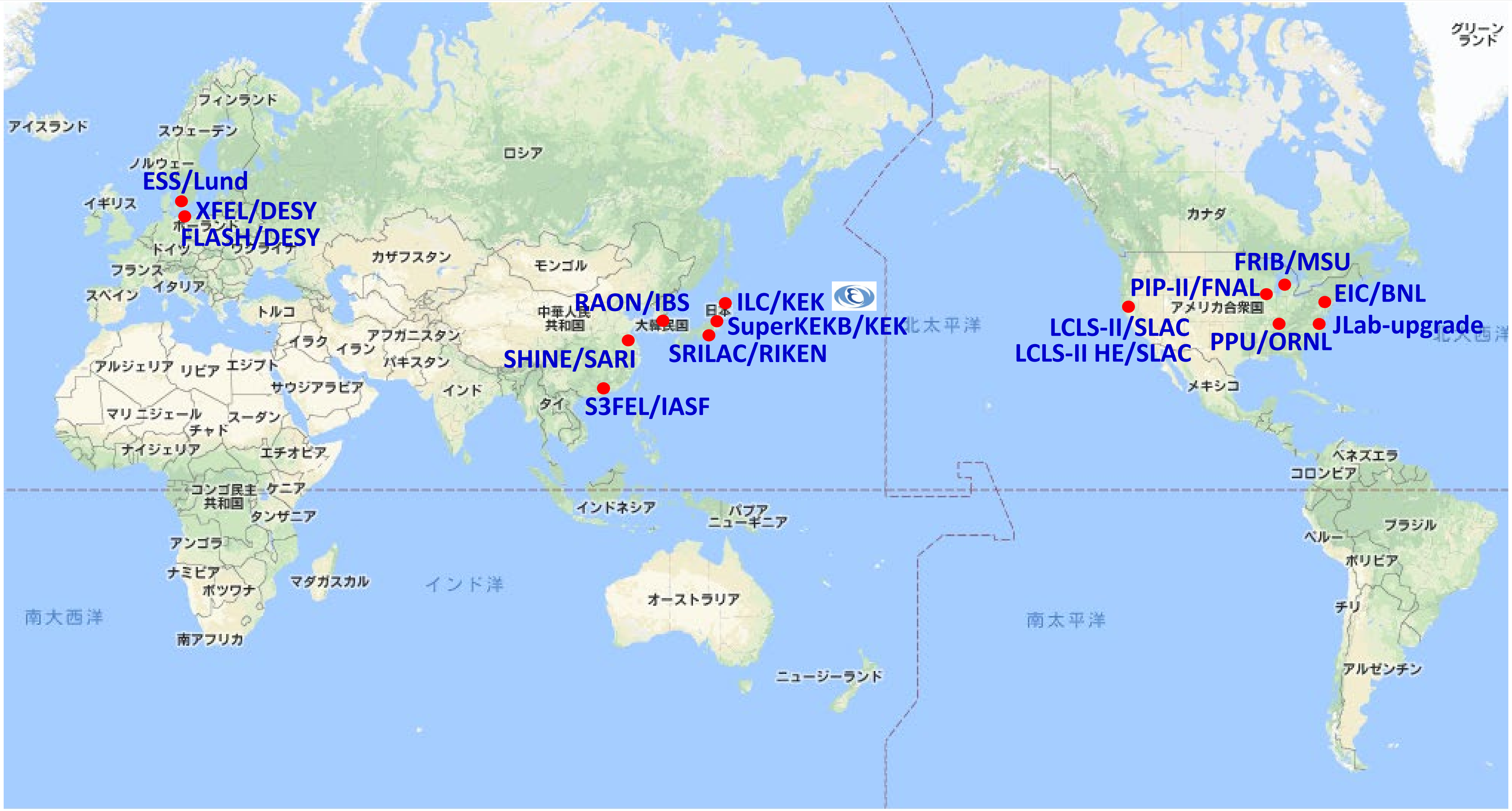
SRF2023 - Proceedings
Grand Rapids, MI, USA
- Pre-Press Publication 30-June-2023 14:00 UTC -

MOIAA	Facility I
MOIXA	Facility II
MOPMB	Monday Poster Session
TUIAA	Facility III
TUCAA	Facility IV
TUIBA	Fundamental R&D I
TUCBA	Fundamental R&D II
TUIXA	SRF Technology I
TUCXA	SRF Technology II
TUPTB	Tuesday Poster Session
TUCTA	Commemorative Talks
WEIAA	SRF Application I
WECAA	SRF Application II
WECBA	Fundamental R&D III
WEIBA	Fundamental R&D IV
WEIXA	Fundamental R&D V
WEPWB	Wednesday Poster Session
WEKEA	Keynote
THIAA	SRF Technology III
THCAA	SRF Technology IV
THIXA	SRF Technology V
FRIBA	SRF Technology VI

Click on an Session to display a list of papers.

Around 250 Participants

SRF Facility Talks in SRF2023



SRF Facility (1): FRIB/MSU, USA

FRIB

FRIB transition to user operations, power ramp up, and upgrade perspectives

Jie Wei
On Behalf of FRIB Accelerator Team & Collaboration
SRF 2023, Grand Rapids, June 26, 2023

MICHIGAN STATE UNIVERSITY — U.S. DEPARTMENT OF ENERGY, Office of Science

This material is based upon work supported by the U.S. Department of Energy Office of Science under Cooperative Agreement DE-SC0000661. Michigan State University designs and establishes FRIB as a DOE Office of Science National User Facility in support of the mission of the Office of Nuclear

FRIB Technical Construction 2014 – 2022

World's Highest Energy Heavy Ion Linac / CW Hadron Linac

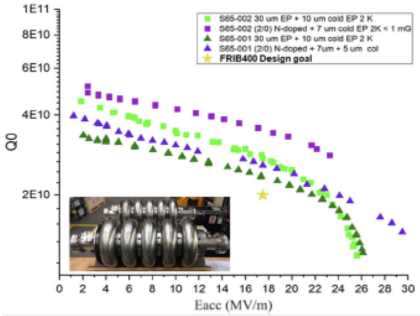
FRIB driver linac in accelerator tunnel

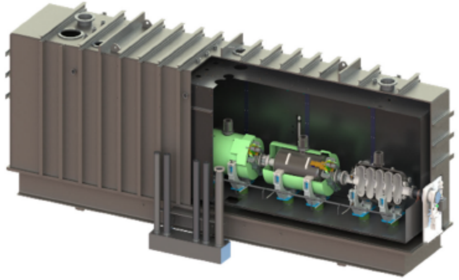
FRIB

- Beam Power: starting at 1 kW, current operation at 5 kW, working toward to 400 kW.
- Upgrade of Beam Energy: 400 MeV/u, 11 cryomodules, 644 MHz, 5-cell cavity (β=0.65)

FRIB400: Extend Scientific Reach and Discovery Potential

- Doubles linac beam energy (to 400 MeV/u for uranium) by adding 11 cryomodules, each containing 5 (β = 0.65) cavities at 644 MHz
  - Filling reserved slots in FRIB tunnel
  - Expanding cryo-distribution
- R&D and design in progress





FRIB Facility for Rare Isotope Beams
U.S. Department of Energy Office of Science
Michigan State University
J. Wei, SRF2023 MOIAA01, Slide 26

Summary

- FRIB has been operating for a year, delivering beams for both scientific and industrial experiments with the desired reliability and availability
- The primary beam power has been steadily raised from 1 to 5 kW. In subsequent years, the beam power will be progressively increased as operational experience is accumulated, working toward 400 kW
- Accelerator improvement projects, capital equipment investments, and R&D projects are in progress to renovating legacy systems and maintain high availability during the beam power ramp-up
- Work is proceeding in preparation for future upgrades, including a doubling of the primary beam energy to 400 MeV/u to enhance the scientific reach of the facility

FRIB Facility for Rare Isotope Beams
U.S. Department of Energy Office of Science
Michigan State University
J. Wei, SRF2023 MOIAA01, Slide 29

SRF Facility (2): RAON/IBS, Korea

RAON Rare isotope Accelerator complex for ON-line experiments

Status of RAON Superconducting Linac at IBS

June. 26, 2023
SRF2023 Grand Rapids

Yeonsei Chung
on behalf of IRIS(Institute for Rare Isotope Science)

ibS 기초과학연구원 Institute for Basic Science

RISP 중이온가속기건설구축사업단 Rare Isotope Science Project

Superconducting Linac, SCL3 Tunnel and Gallery


QWR & HWR Cryomodule


Cryogenic Distribution to Cryomodule


Clean beam line assembly


CM/Cryogenic Control Rack and SSPA

Installation completion and ready for beam commissioning in 2021

ibS 기초과학연구원 Institute for Basic Science

Summary & Outlook

- **Injector beam commissioning was carried out, achieving machine setting and key measurements :**
  - measured beam parameters (energy, emittance, Twiss parameters, beam sizes etc)
  - capable of controlling LEBT and MEBT beam optics freely as needed
  - achieved beam transmission of 95% max (routinely > 90%)
  - machine verification including diagnostics devices
- **Linac(SCL3) beam commissioning**
  - 1st/2nd beam commissioning using 22 QWRs were successfully done
  - beam commissioning of HWR section was done in May 2023
  - delivered Ar(9+) beams to KoBRA target, then RI beams produced
- **Plan for SIB/RIB experiments**
  - RIBs from ISOL will be injected into SCL3/Injector in Q4 of 2023
  - SIB experiments(ECR→SCL3 → KoBRA/NDPS) is planned in 2024
- **Plan for SCL2 linac construction**
  - CM(SSR1, SSR2) R&D project : 2022.12~2025.12
  - SCL2 construction is expected to begin in 2026

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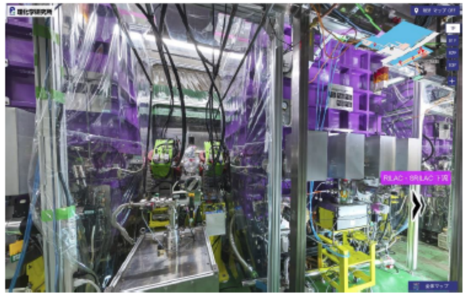
RAON

- Beam Energy = 17.6 MeV/u
- R & D of SC2 linac: 2022-2025 Dec.
- SCL2 construction 2026~

SRF Facility (3): SRILAC/RIKEN, Japan

Operational Experience for RIKEN Superconducting Linear Accelerator



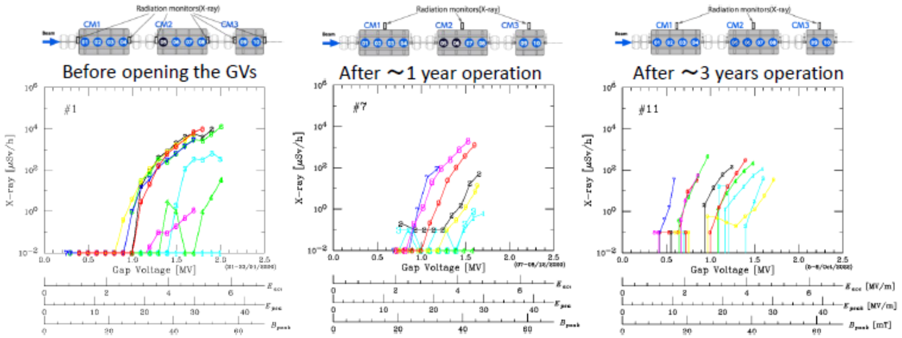
Kazunari Yamada

SRILAC-RIKEN

- 345 MeV/u, 73.0 MHz, beta=0.078, 4.5 K,
- Differential vacuum pumping system
- 4 years operation, 90% availability
- Cryogenics: 600 W at 4.5 K
- X-ray: remarkably increase for 3 years
- Pulsed conditioning: 20 ms, 0.5 Hz, good effect
- 10 new couplers,
- 2 spare QWR cavities

Degradation of SC-QWR performance

- After an impact of SC06 coupler-window-break emission levels of SC07, SC08 became higher than those of the measurement #1.
- The deterioration of SC05, 06, 07, and 08 (CM2) is significant.
- X-ray emissions were gradually increasing in the CM1 and CM3 after 3 years.
- Increase in the emissions occurs suddenly during beam delivery.
- No events such as increased beam loss or gate valve opening/closing at this time.



Summary

- SRILAC has been in actual operation for 4 years.
- Availability of the SRILAC part is over 99%.
- Beam tuning time is getting shorter.
- Pulse conditioning recovered the performance degradation caused by field emissions.
- The problem of helium pressure fluctuations still remains.
- New couplers and cavities are being prepared.

See you at the SRF2025 in Tokyo!

SRF Facility (4): ESS/Lund, Sweden

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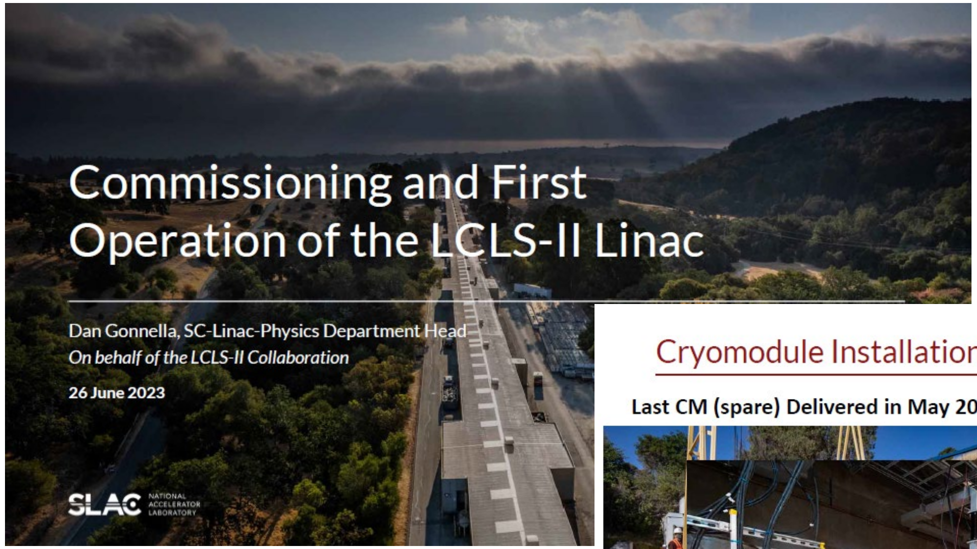
ESS

- 2025 first commissioning
- 2027 first science
- 13 Spoke CM, 9 Medium beta CM, 27 High beta CM
- Installation 2 CM/months

SRF Facility (5): LCLS-II/SLAC, USA



Cryomodule Installation

Last CM (spare) Delivered in May 2021

CM Installation Complete February 2021

SLAC D. Gonnella, LCLS-II Commissioning

For more details see D. White MOPMB089

SC Linac Commissioning Accomplishments & Remaining Tasks

Linac Commissioning

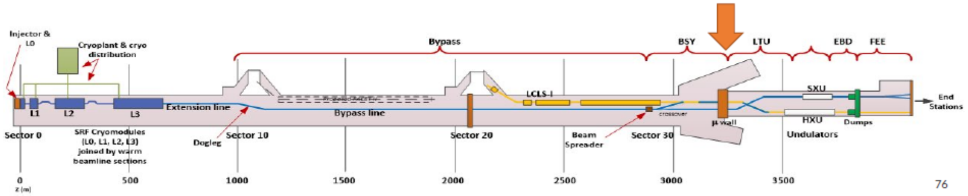
- ✓ Established the first-time beam through the three main SC linac sections (L1B, L2B, and L3B) in October 2022
- ✓ 3.5 GeV beam transported to BSY dump in November 2022
- ✓ Record injector performance has been demonstrated
- ✓ Demonstration of repetition rate of 93 kHz in June 2023

Photon Commissioning

1. Beam transport to undulator halls
2. First photons

Estimate to complete August 2023

Current beam commissioning progress



Summary

- Commissioning of the LCLS-II linac has progressed very well
- Cavity performance has been excellent with NO DEGRADATION FROM INSTALLATION
- Average Q_0 exceeds the LCLS-II specification and demonstrates high-Q_0 in an installed linac for the first time
- All linac commissioning milestones have been met, estimate to reach first light by the end of the summer
- This is only the beginning…

SLAC D. Gonnella, LCLS-II Commissioning 30

<u>LCLS-II</u>

- 2/6 Nitrogen Doping
- 35 CM, 280 9-cell cavities
- Degauss in tunnel for higher Qo
- Microphonics less than 10 Hz
- 3.5 GeV beam energy, target 4.0 GeV
- 2023 August, Complete, first light

SRF Facility (6): LCLS-II HE/SLAC, USA

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HE vs LCLS-II CM test: field emission

LCLS-II-HE

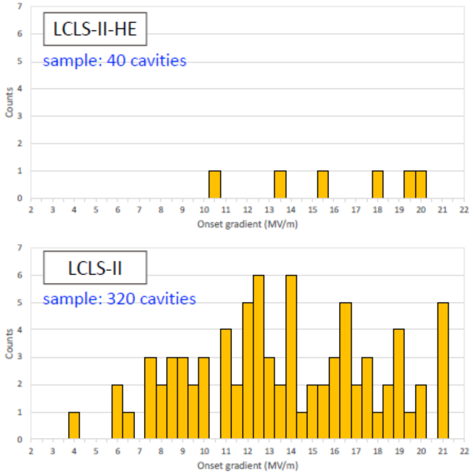
- **15.0% of cavities with FE** during CM test (6 cavities out of 40)
- **Average onset: 16.03 ± 3.8 MV/m**
- Admin limit 26 MV/m

LCLS-II

- **25.3% of cavities with FE** during test CM (81 cavities out of 320)
- **Average onset: 13.4 ± 4.3 MV/m**
- Admin limit 21 MV/m

FE-free qualification criteria outcome

- **10.3% less FE cavities** in CM testing than LCLS-II



SLAC M. Checchin | SRF 2023, Grand Rapids, MI

Conclusions

Cavities qualification is proceeding without obstacles

- In average, cavities **outperform VT qualification criteria**
  - New surface processing is delivering the expected results
  - Material segregation by heat lot good practice to maintain high-Q in CM testing

CM assembly and test are underway

- In average, the CMs tested so far **outperform LCLS-II-HE specifications**
  - Average voltage: **202.6 MV**
  - Average Q_0: **3.0×10^{10} @ 173 MV**
- 15% of cavities are field-emitting in CM testing
  - FE-free qualification criteria in VT is delivering the expected results

SLAC M. Checchin | SRF 2023, Grand Rapids, MI 30

LCLS-II HE

- 35 CM (280 cavities) + 23 CM (184 cavities) = 8 GeV
- CM installation 2025-2026
- 2/6 -> 2/0 doping
- Mixed 900/950 oC HT
- FE 26%, 65% after HPR

SRF 2023 GRAND RAPIDS
21st International Conference on Radio-Frequency Superconductivity

SRF Facility (7): CEBAF-upgrade/JLab, USA

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Commissioning of the 2nd JLAB C75 Cryomodule

& Performance Evaluation of Installed C75 Cavities

M. McCaughan; G. Ciovati; K. Davis; M. Drury; T. Powers; A. Reilly

Monday, June 26, 2023

Jefferson Lab

U.S. Department of Energy, Office of Science

Types of Cavities / Cryomodules:

Parameter	Unit	C20 (Orig. CEBAF/Cornell)	C50 (Refurbished)	C100 (Low Loss)	C75 (High Current)
Number of cells		5	5	7	5
L act	M	0.4999	0.4999	0.7	0.4916
Energy gain/CM (design)	MeV	20	50	100	75
Eacc/cavity (design)	MV/m	5	12.5	17.86	19.07
Q0 at 2.07 K		> 2.4e9	4.6e9	7.2e9	8.0e9
$Q_{ext,FPC}$ spec		6.6e6 (± 20%)	8.0e6 (± 25%)	3.2e7 (± 20%)	2.0e7 (± 15%)
R/Q [Ueff^2/(ω*W)]	Ω	482.5		868.9	525.4
R/Q per cell	Ω	96.5		124.1	105.1

F. Marhauser et al., "C75 Cavity Specifications and Commissioning of the Prototype Cavity Pair", JLAB-TN-17-055, 12/6/17

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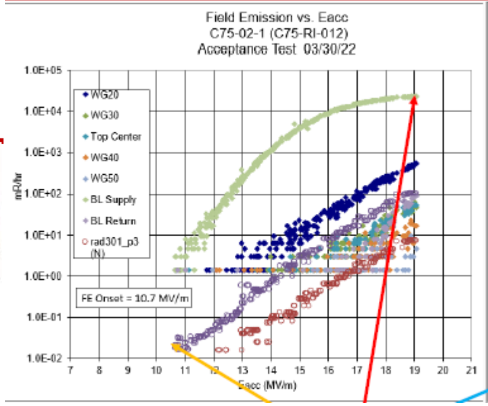
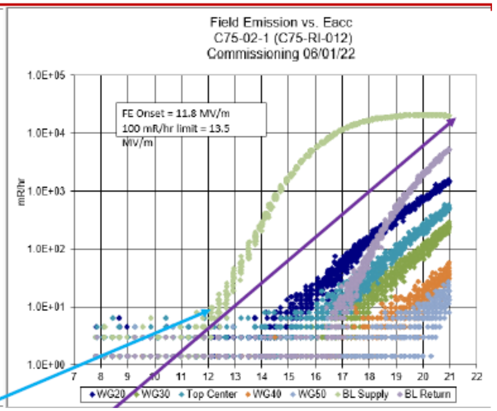
Cavity Performance: Field Emission

GM Detectors @ FPCs and fore and aft of the module.





Summary

- C75s cost-efficient & novel use of large grain boundary ingot Nb. Process industrialized with RI & CBMM.
- Enhanced gradient over legacy C50 program very helpful for the purposes of the CEBAF Performance Plan (CPP) and establishing / maintaining 12 GeV energy reach.
- Circulators limit primary barrier preventing installed C75 zones from operating at potential; remedying now – gradient limits & microphonics studies will be revisited.
- Steady state operational data and any possible performance degradation data (if it exists) will be extracted over next year+ and studied.
- C20 to C75 refurbishment schedule planned to continue at ~2 modules/year through at least C75-10.

A. Freyberger et al., The 12 GeV CEBAF Performance Plan; V. 1.1, JLAB-TN-17-022, 19 June 2017

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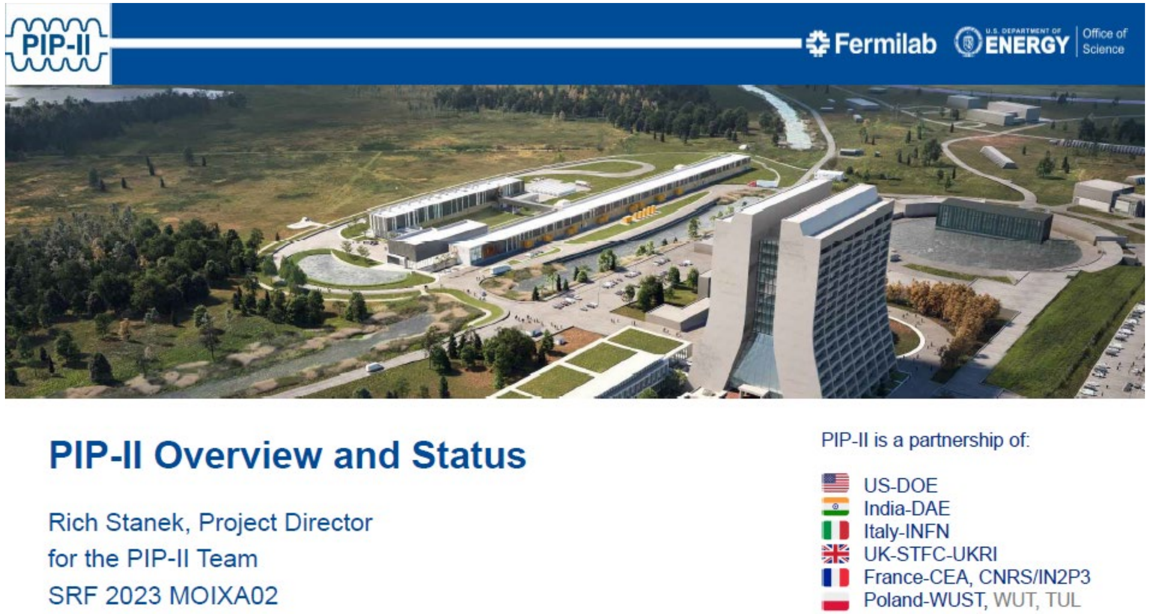
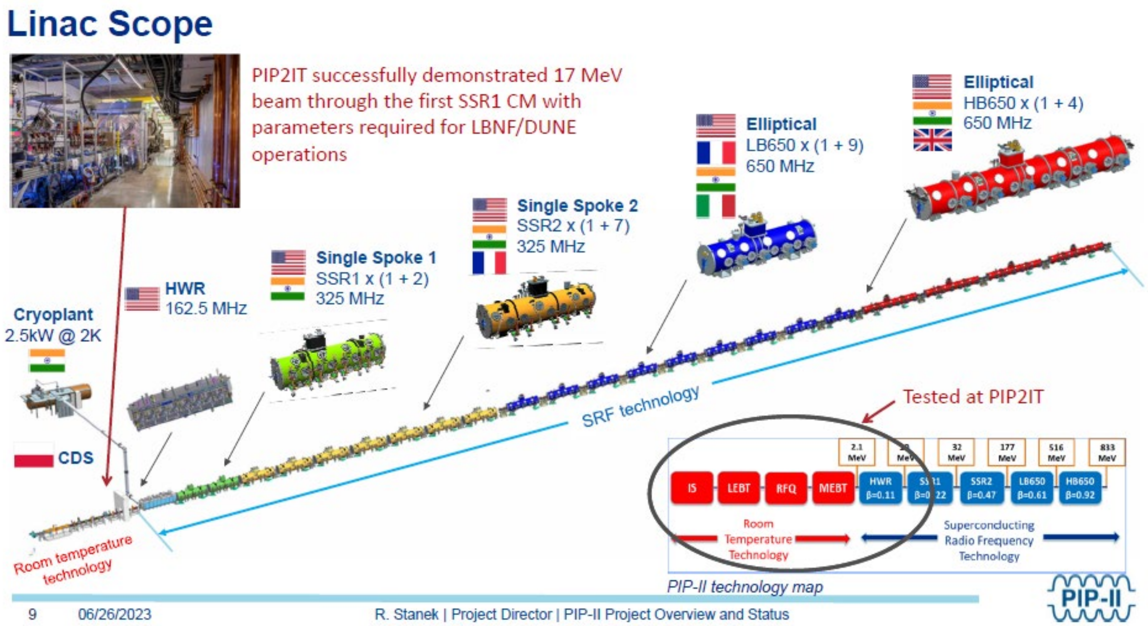
JLAB upgrade

- Eacc = 19.07 MV/m, Qo = 8 x 10^9
- T = 1 mm cryoperm, < 10 mG
- LG Nb, from CBMM ingot, fabrication by RI
- C100: Low loss – 7-cell, C75: High current- 5-cell
- X-rays > 14 MV/m

SRF Facility (8): PIP-II/FNAL, USA





Summary

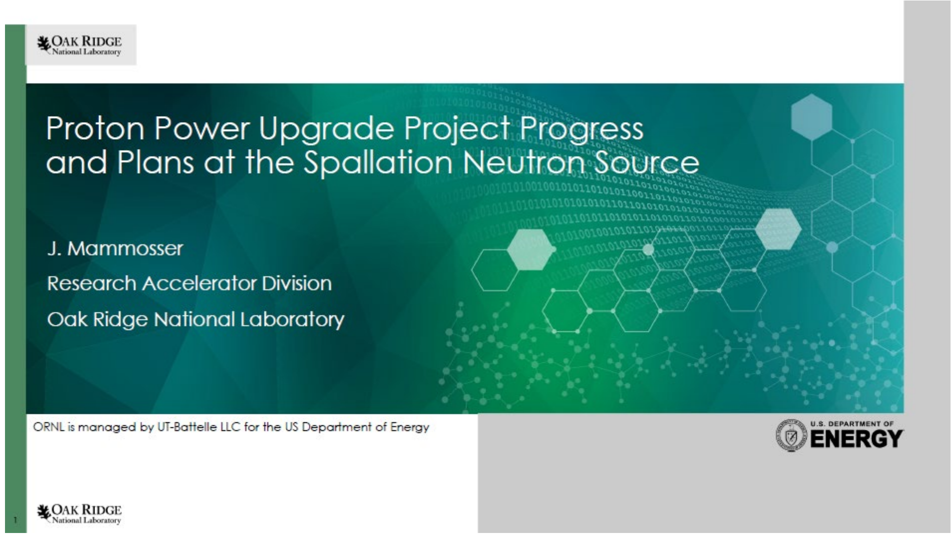
- PIP-II Team is working very well together
  - Partners are engaged and committed to delivering their components
- PIP-II experienced unprecedented turnover in the management team but we have rebuilt and now have a strong, experienced team in place
- Technical progress at both Fermilab and Partners has been good
  - Contracts for key components are being executed and parts delivered
  - Moving closer to cryomodule production

Project execution is underway, our technical teams are talented and motivated to deliver the PIP-II Project

PIP-II

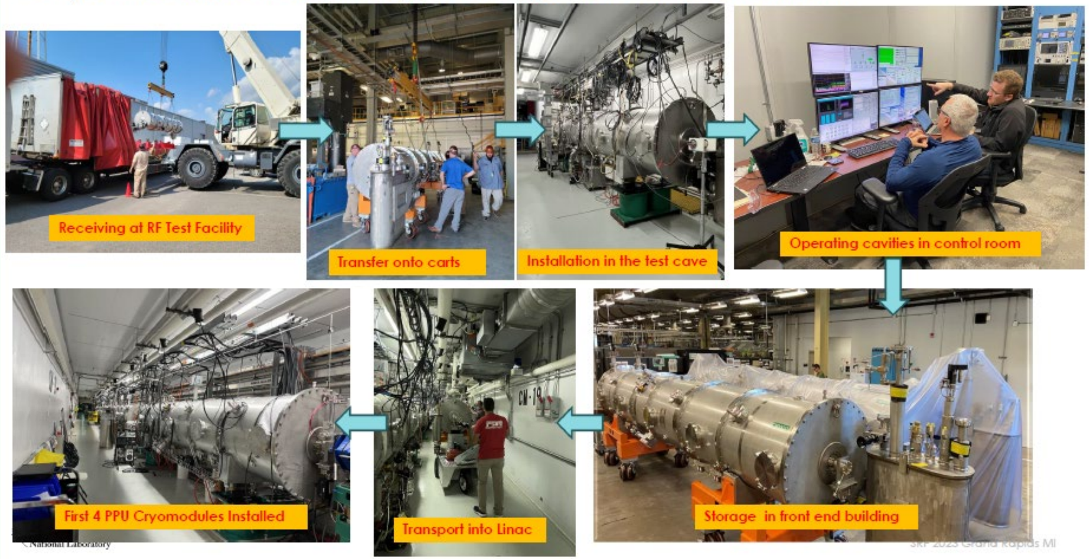
- 800 MeV, H- beam, 1.2 MW beam power
- 20 Hz, 1 mA
- HWR 162.5MHz, Spoke-1 325MHz, Spoke-2 325MHz, LB 650MHz, HB 650MHz
- LB650 CM by CEA-Saclay, HB650 CM by UKRI

SRF Facility (9): PPU/ORNL, USA


Proton Power Upgrade Project Progress and Plans at the Spallation Neutron Source

J. Mammosser
Research Accelerator Division
Oak Ridge National Laboratory

ORNL is managed by UT-Battelle LLC for the US Department of Energy



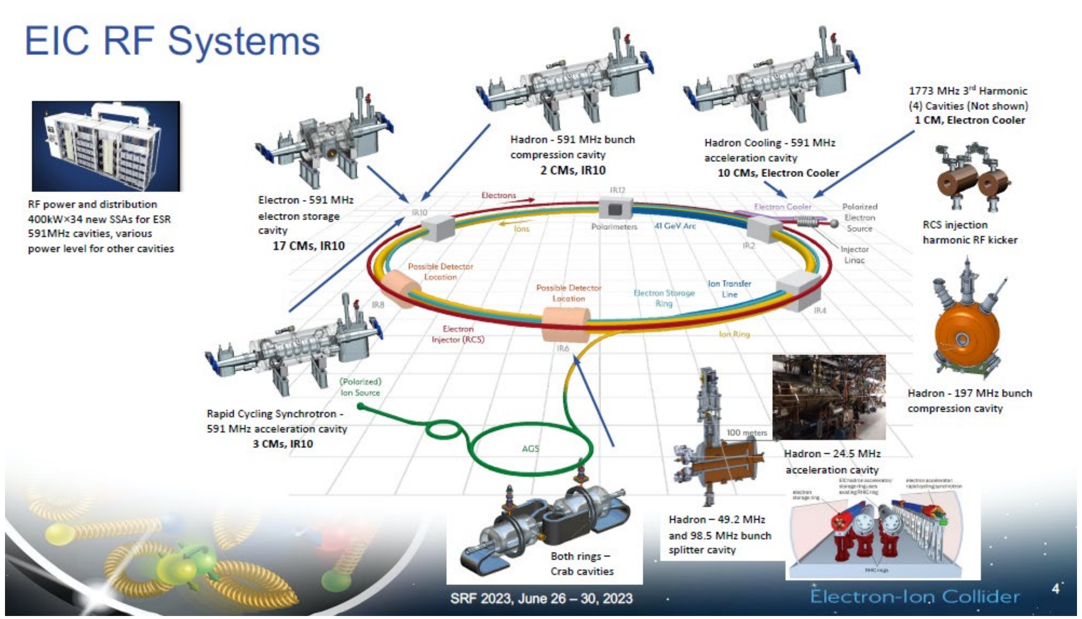
PPU-ORNL

- Beam power: 1.4 MW to 2.8 MW
- Beam energy: 1.0 GeV to 1.3 GeV,
- +7 CM (32 cavities by RI)
- 60 Hz, 27 mA
- 2022’ 2 CM, 2023’ 2 CM, 2024’ 3 CM
- No HOM coupler
- 2.1 K, 16 MV/m, Qo > 1x 10^10
- Multipacting: 11~15 MV/m

Conclusion

- PPU Project is now 80% complete going extremely well with only one remaining down for installation of equipment and remaining civil construction
- The PPU cryomodules, ring magnets and target system upgrades are underway with good progress
  - **Installed equipment is functioning at design specifications**
- Thanks to our Partner Labs and Industrial Vendors, PPU is on track due to the excellent collaborations

SRF Facility (10): EIC/BNL, USA



EIC project

- 197 MHz QWR SRF-Gun
- ESR 591 MHz 1-cell cavity with 2 FPC: 3.7 MV, 800 kW per cavity
- 591 MHz, 400 kW SSA
- 61 kW HOM power, RT water cooling, SiC cylinder
- FPC: 1 MW TW, 500 kW full reflection, window brazing test
- 197 MHz Crabbing cavity, 394 MHz RFD Carb cavity
- Crab cavity cryomodule design: press forming R&D
- Prototyping of 591 MHz single-cell cavity and 197 MHz crab cavity
- 60 cavity, 47 cryomodules: last unit installed by 2031

Summary

- FPCs are one of most challenging items in EIC RF/SRF system
- Recent developments on the broadband, high power FPC window for EIC was reported.
- EIC prototype testing in Sept. 2024!

SRF Facility (11): SHINE/SARI, China

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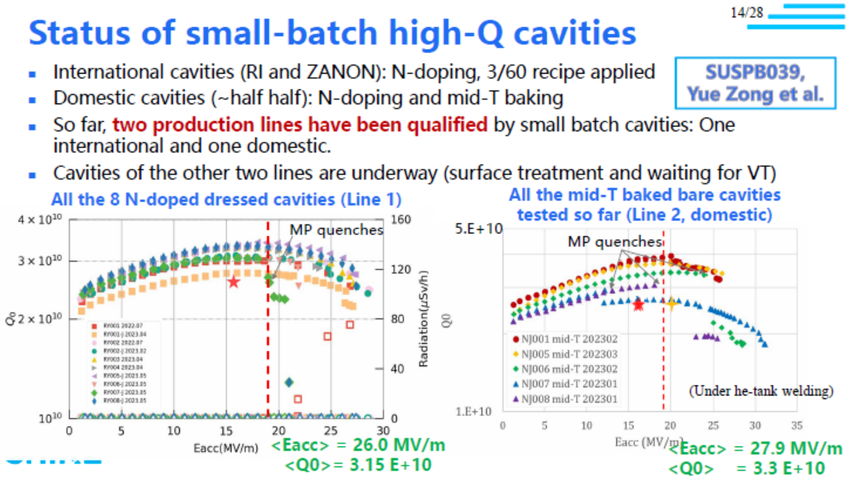
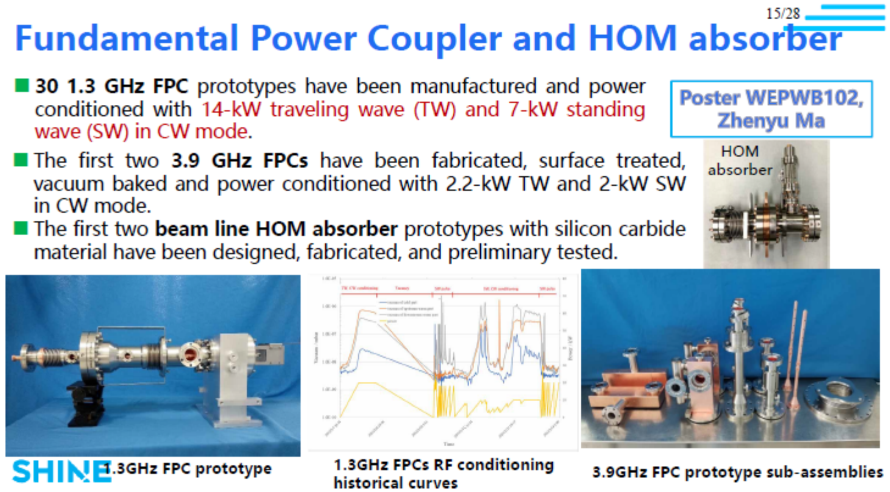
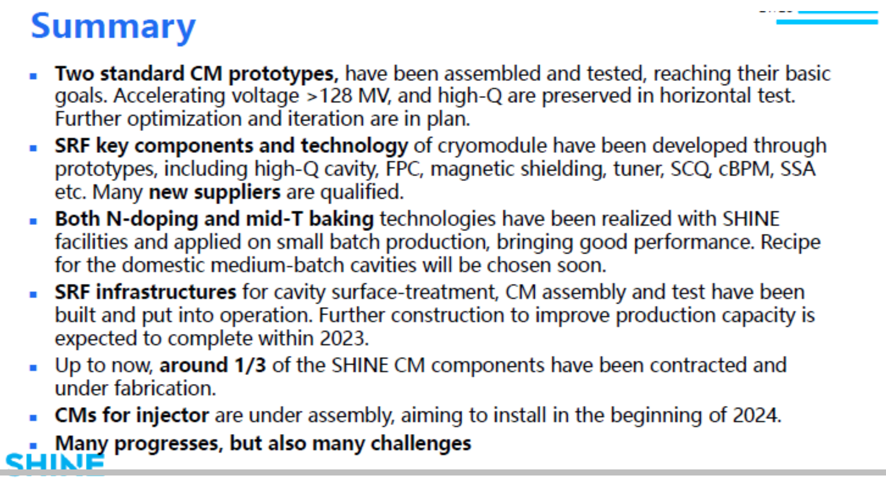




SHINE

- 75 CM, 130 MV/CM
- Two standard CM prototype
- CM2: 6 mid-T baked, 1 N-dope, 1 LG = 136 MV, Qo = 2.44 x 10~10
- Microphonics < 10 Hz
- Cavity fabrication by HERT+IHEP, OSTEC+PKU, HIT+SARI, RI+DESY
- FPC: 14 KW TW, 7 kW SW in CW
- Dual layer magnetic shield < 5 mG
- Demagnetization of Cryostat
- SHINE tunnel completed



Summary

- **Two standard CM prototypes**, have been assembled and tested, reaching their basic goals. Accelerating voltage >128 MV, and high-Q are preserved in horizontal test. Further optimization and iteration are in plan.
- **SRF key components and technology** of cryomodule have been developed through prototypes, including high-Q cavity, FPC, magnetic shielding, tuner, SCQ, cBPM, SSA etc. Many **new suppliers** are qualified.
- **Both N-doping and mid-T baking** technologies have been realized with SHINE facilities and applied on small batch production, bringing good performance. Recipe for the domestic medium-batch cavities will be chosen soon.
- **SRF infrastructures** for cavity surface-treatment, CM assembly and test have been built and put into operation. Further construction to improve production capacity is expected to complete within 2023.
- Up to now, **around 1/3** of the SHINE CM components have been contracted and under fabrication.
- **CMs for injector** are under assembly, aiming to install in the beginning of 2024.
- **Many progresses, but also many challenges**

SHINE

SRF Facility (12): S3FEL/IASF, China

Shenzhen Superconducting Soft-X-Ray Free Electron Laser (S^3FEL)

Weiming Yue (on behalf of Weiqing Zhang)
S^3FEL team
深圳综合粒子设施研究院
Institute of Advanced Science Facilities, Shenzhen

<u>S3FEL</u>

- 6 years construction period
- 2.5 GeV, approved
- 26 CM, 208 9-cell cavities, Input couplers, tuners
- SRF module Test Facility (SMTF)
- Cooperation with SHINE and IHEP
- 2023 start, 2028 complete

SRF Facility (13): Super-KEKB/KEK, Japan

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Operating Experience of SRF System at High Beam Current in SuperKEKB

Michiru Nishiwaki on behalf of RF group of SuperKEKB

SRF2023 Grand Rapids

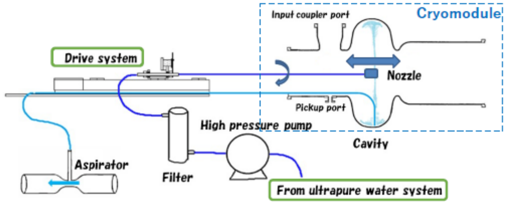
June 26, 2023

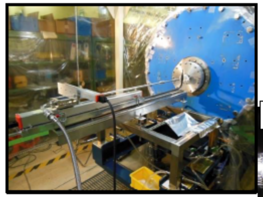
MOIXA05

Horizontal High-Pressure Rinse (HHPR) system

- New High-Pressure Rinse (HPR) with ultrapure water system was developed.
- We can apply HPR to the cavity in the cryomodule.
- The system is equipped with automatic nozzle driving system in horizontal and rotational.
- Input coupler and both end groups, including ferrite HOM damper, taper chamber, bellows chamber, ion pump, vacuum gauges and GV, are removed before HHPR in a clean booth.
- Water in the cell is pumped up by aspiration system during rinsing.
- Only cell and iris area are rinsed.

HHPR Parameters	
Water Pressure	7 MPa
Nozzle	φ0.54mm x 6
Driving speed	1 mm/sec.
Rotation speed	6 deg./sec.
Rinsing time	15 min.

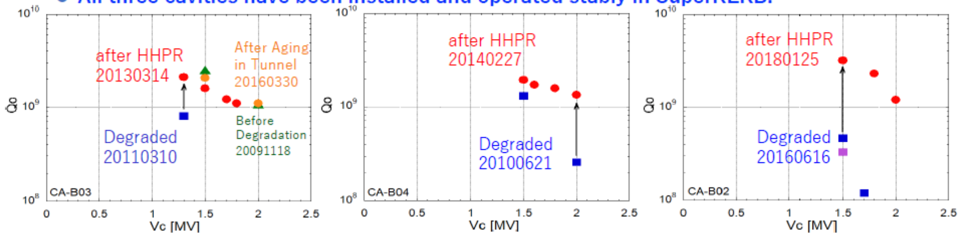




Stainless Steel Nozzle

Performance Recovery by HHPR

- We have already applied HHPR to three cryomodules degraded by strong FE.
- HHPRed modules were tested with high power at 4K.
- Before cooling, baking were not performed.
- **Cavity performances were successfully recovered.**
- **All three cavities have been installed and operated stably in SuperKEKB.**



We are planning to perform the HHPR in the accelerator tunnel. There are many difficulties such as maintaining cleanliness, working in narrow spaces, and supplying ultrapure water. However, it has the great advantage that no extensive work is required to move the cavity out of the tunnel. We will continue R&D.

Super-KEKB

- 8 CM, 508 MHz, beam current = 2.6 A, HOM 37 kW
- FPC: 5x10^4, CW 400 kW
- Additional SiC HOM absorber:
- In-situ HHPR: 3 CM, recover cavity performance
- MP in cavity, piezo break-down, chiller failure for HOM absorber, trip rate= 0.04-0.07/day

SRF Facility (14): ILC/KEK, Japan

Innovation Center for Applied Superconducting Accelerators
応用超伝導加速器イノベーションセンター

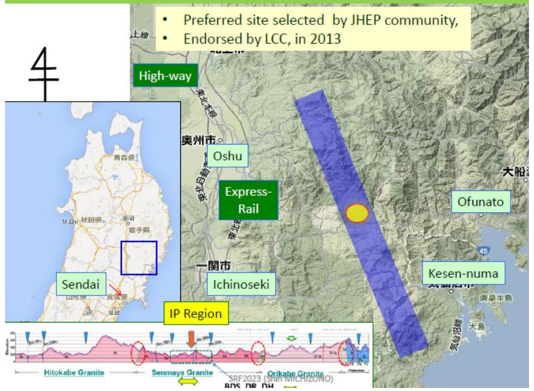
Current Status and Future Technological Collaboration for the ILC

KEK / IDT-WG2
Shin MICHIZONO (KEK)

1. Why linear collider?
2. Higgs Factory
3. Global Collaboration
4. ILC Accelerator
   - ILC design
   - Recent Progress
   - Candidate site
5. Pre-lab proposal
6. Global Project
7. ILC Technology Network
8. KEK's effort
9. Future Upgrade
10. Beam dump (industrial application)
11. Sustainability
12. Summary

ILC Site Candidate Location in Japan: Kitakami

- Preferred site selected by JHEP community,
- Endorsed by LCC, in 2013



Summary

- ILC is the e-/e+ linear collider for **the Higgs factory**.
- Current global organization is **ILC International Development Teams (IDT)**
- The ILC key technologies of "**SRF**", and "**Nano-beam**"
  - **Matured** to be ready for an e+e- Higgs Factory based on the **Linear Collider** technology.
- ILC is the **global project** like ITER and SKA.
- IDT-WG2 identified important and time-consuming WPs.
- These WPs will be carried out by international collaboration as "**ILC Technology Network**".
- **KEK obtained a budget** for these R&Ds and started the activity from this April.
- New SRF technology (such as **Nb3Sn, TW**) can be applied to ILC future upgrade.
- Beam dumps of the ILC are also useful for the industrial application like "**Soft error**" analysis.
- **Sustainability** is the also important topics for the large accelerators.

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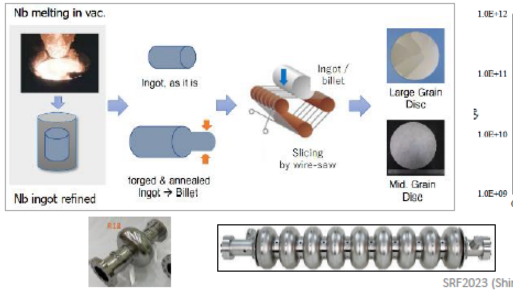
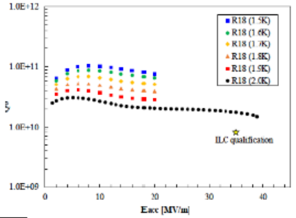
WP-prime 1: SRF Cavity
(Scoping the Industrial-Production Readiness)

Referring European XFEL and LCLS-II experiences

- Research with single-cell cavities to establish the best production process including:
  - Advanced Nb sheet production method
  - Advanced surface treatment recipe
- Globally common design with compatible High Pressure Gas Safety (HPGS) regulation
- 24 nine-cell cavities are to be developed for industrial-production readiness
  - 8 cavities (4 / batch) in each region
  - Production process encouraged to be optimized in each region
  - Cavity performance expected: E_{acc} = <35 MV/m> (+/- 20%), Q_0 = 1.0 x 10^{10}, Yield = ≥90%
- RF performance/success yield to be examined (including 2^{nd} pass and further)
  - 3^{rd} pass to be examined if effective

	# of cavities to be produced		
	Americas	Europe	JP/Asia
single-cell	2	2	2 (+4)
nine-cell	8	8	8 (+ 4)





Material/Sub-component → QA of Material/Sub-C → Cavity Production → Surface Process → Vertical Test = Cavity RF Test

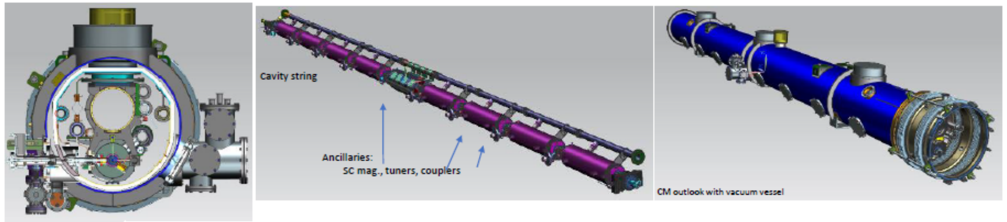
Production process

SRF2023 (Shin MICHIZONO) 53

WP-prime 2: Cryomodule (CM) Design
(Scoping the CM Global Transfer and Performance Assurance)

Referring European XFEL and LCLS-II experiences

- Unify cryomodule (CM) design with ancillaries, based on globally common engineering design, drawings & data-base
- Establish globally compatible safety design base to be approved/authorized by HPGS regulations individually in each region, most likely referring ASME guidelines to be compatible with Japanese regulations.



Region Regulation	Americas ASME	Europe Eu-EN, TUV	Japan/Asia JP-HPGS Act
CM tech. design base	LCLS-II	Euro-XFEL	KEK-STF, AST-IFMIF
ILC CM design	Common CM design globally compatible to HPGS regulation in all regions, and most likely ASME guidelines to be compatible with Japanese regulations.		

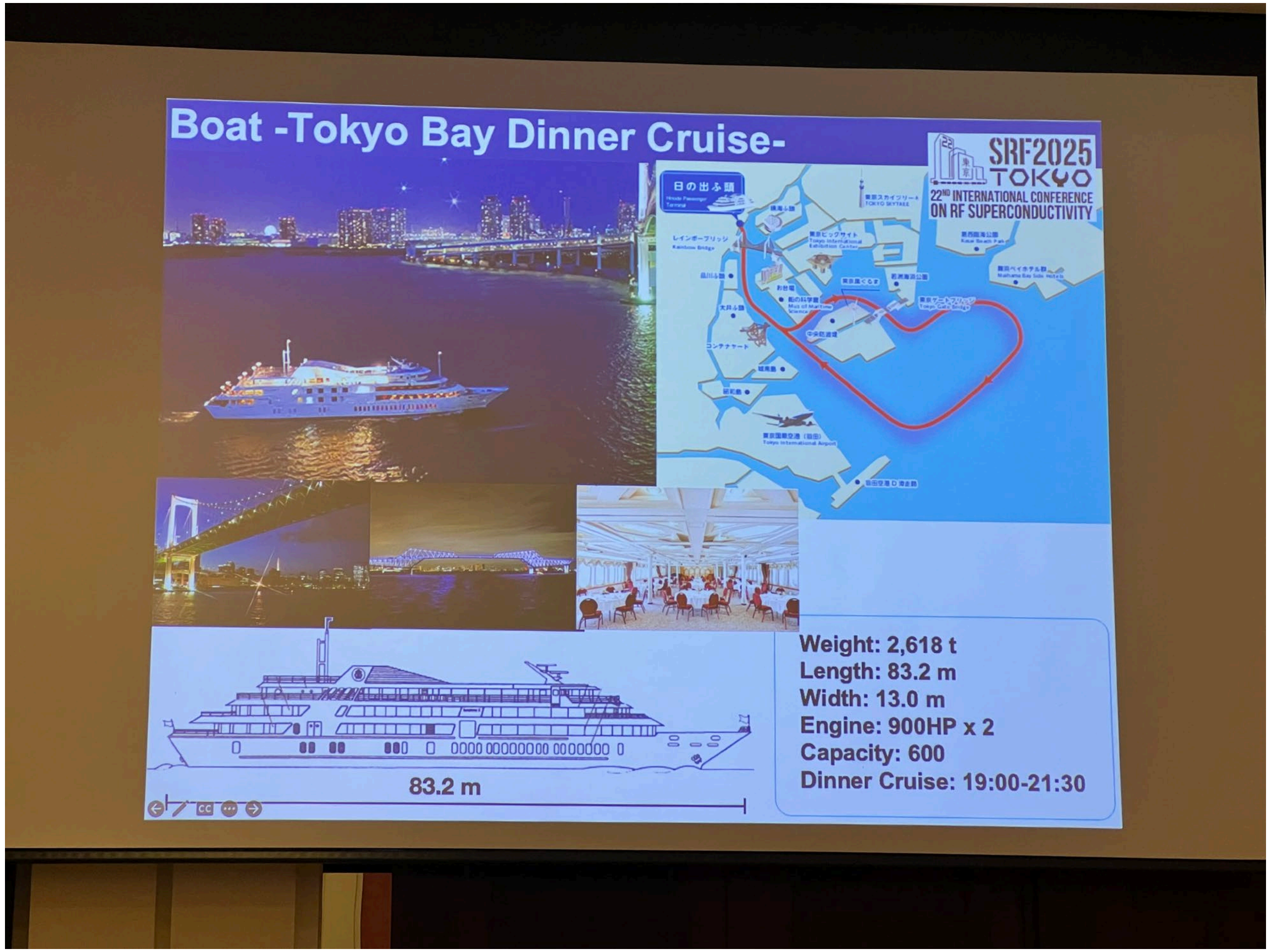
SRF2023 (Shin MICHIZONO) 54

SRF 2023 GRAND RAPIDS
21st International Conference on Radio-Frequency Superconductivity

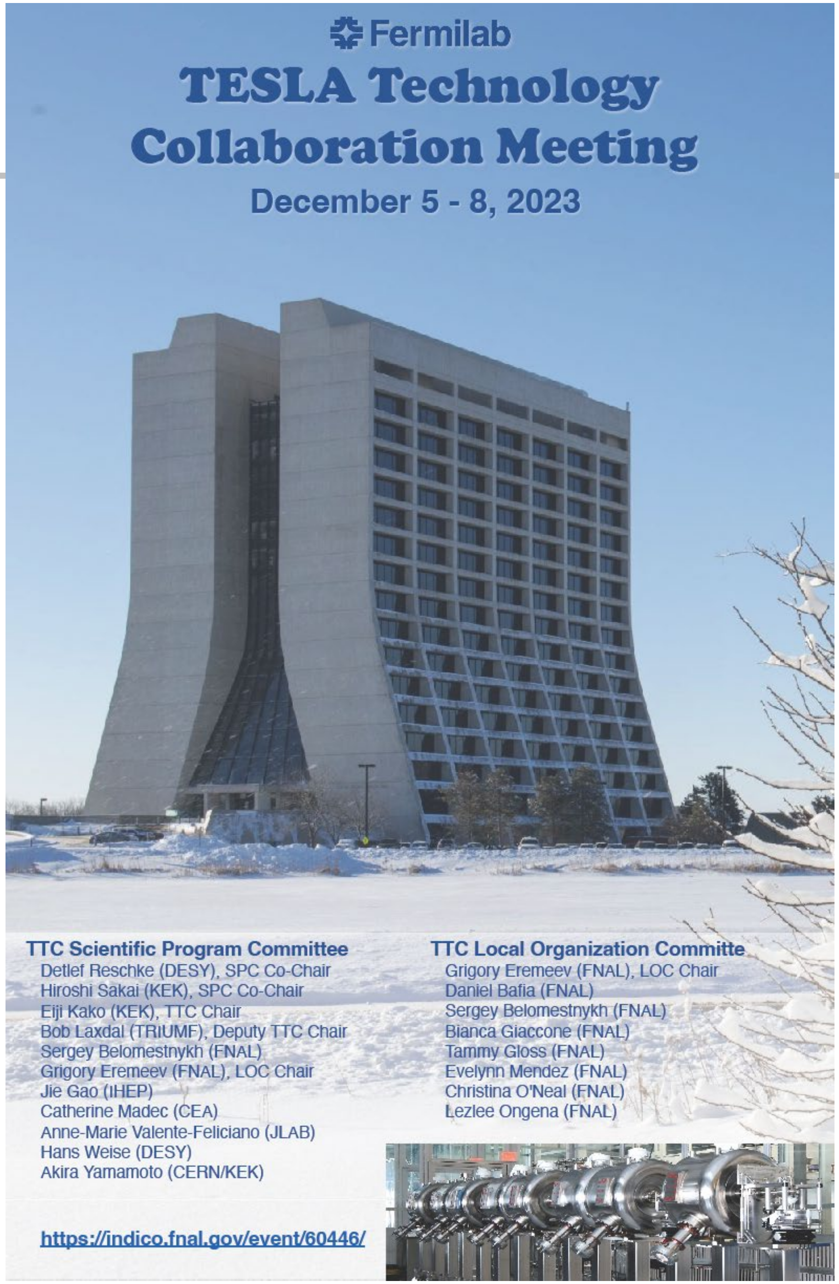
Excursion : Boat Tour

Banquet : Dinner

SRF2025 at Tokyo, Japan



SRF2027 at Padua, Italy



TTC2023 meeting at FNAL

Innovation Center for Applied Superconducting Accelerators
応用超伝導加速器イノベーションセンター

December 5 - 8, 2023’

TTC2023 Home-page
https://indico.fnal.gov/event/60446/

Time	Date	December, 5 (Tue)	December, 6 (Wed)	December, 7 (Thu)	December, 8 (Fri)
8:30 - 9:00		Registration			
9:00 - 9:30		Welcome/Introduction	Plenary talk 3	Plenary talk 6	Special Seminar 1
9:30 - 10:00		Plenary talk 1	Plenary talk 4	Plenary talk 7	
10:00 - 10:30		Plenary talk 2	Plenary talk 5	Plenary talk 8	Special Seminar 2
10:30 - 11:00	Coffee Break				
11:00 - 11:30					Summary WG1/WG2
11:30 -12:00		WG1 / WG2	WG1 / WG2	WG3 / WG4	Summary WG3/WG4
12:00 - 12:30		(parallel)	(parallel)	(parallel)	TB/CB report
12:30 - 14:00	Lunch				Closing
14:00 - 14:30					
14:30 - 15:00		WG1 / WG2	WG3 / WG4	WG3 / WG4	
15:00 - 15:30		(parallel)	(parallel)	(parallel)	
15:30 - 16:00	Coffee Break				Lab. Tour
16:00 - 16:30					
16:30 - 17:00		WG1 / WG2	WG3 / WG4	Hot Topics	
17:00 - 17:30		(parallel)	(parallel)		
17:30 - 18:00					
18:00 - 18:30		CB meeting	TB meeting		
18:30 - 19:00				Dinner	
19:00 - 19:30					
19:30 - 20:00					

ASSCA2023 at KEK

Innovation Center for Applied Superconducting Accelerators
応用超伝導加速器イノベーションセンター

Jan. 29 – Feb. 4, 2024’

ASSCA2023 Home-page
https://conference-indico.kek.jp/event/216/

School Time Table (as of September 22, 2023)

Time	Jan. 28, 2024 Sunday	Jan. 29, 2024 Monday	Jan. 30, 2024 Tuesday	Jan. 31, 2024 Wednesday	Feb. 1, 2024 Thursday	Feb. 2, 2024 Friday	Feb. 3, 2024 Saturday	Feb. 4, 2024 Sunday	Feb. 5, 2024 Monday
- 8:30		Breakfast							
8:30 - 8:40 (10 min.)		Welcome	Information / Announcement						
8:40 - 10:10 (90 min.)		Introduction 1 (SC & Cryo) Tripti Sekhar DATTA IIT Kharagpur, India	SC Magnet (1) Michinaka SUGANO KEK, Japan	SC Magnet (4) Yasuhiro MAKIDA KEK, Japan	SC Cavity (2) Takeshi DOHMAE KEK, Japan	Special Talk 2 (SC Cavity) Michael PEKELER RI, Germany	Cryogenics (3) Hirotaka NAKAI KEK, Japan		
10:10 - 10:30 (20 min.)		Group Photo	Coffee Break						
10:30 - 12:00 (90 min.)		Introduction 2 (SC Magnet) Toru OGITSU KEK, Japan	SC Magnet (2) Yasushi ARIMOTO KEK, Japan	Special Talk 1 (SC Magnet) Masami IIO, KEK, Japan	SC Cavity (3) Jun TAMURA JAEA, Japan	Cryogenics (1) Tripti Sekhar DATTA IIT Kharagpur, India	Cryogenics (4) Xilong WANG IASF, China		
12:00 - 13:10 (70 min.)	Arrival Day	Lunch						Excursion	Departure Day
13:10 - 14:40 (90 min.)		Introduction 3 (SC Cavity) Eiji KAKO KEK, Japan	SC Magnet (3) Kento SUZUKI KEK, Japan	SC Cavity (1) Hiroaki UMEZAWA Tokyo Denkai, Japan	SC Cavity (4) Naruhiko SAKAMOTO RIKEN, Japan	Cryogenics (2) Rui GE IHEP, China	Special Talk 3 (Cryogenics) Taekyung KI IBS, Korea		
14:40 -15:00 (20 min.)		Coffee Break					Closing		
15:00 - 16:00 (60 min.)		Training A Introduction	Training A	Training B Introduction	Training B	Training C Introduction	Training C		
16:00 - 18:30 (150 min.)		Training A		Training B		Training C			
18:30 -		Welcome Party	Dinner				Banquet		

Thanks for your attention.