

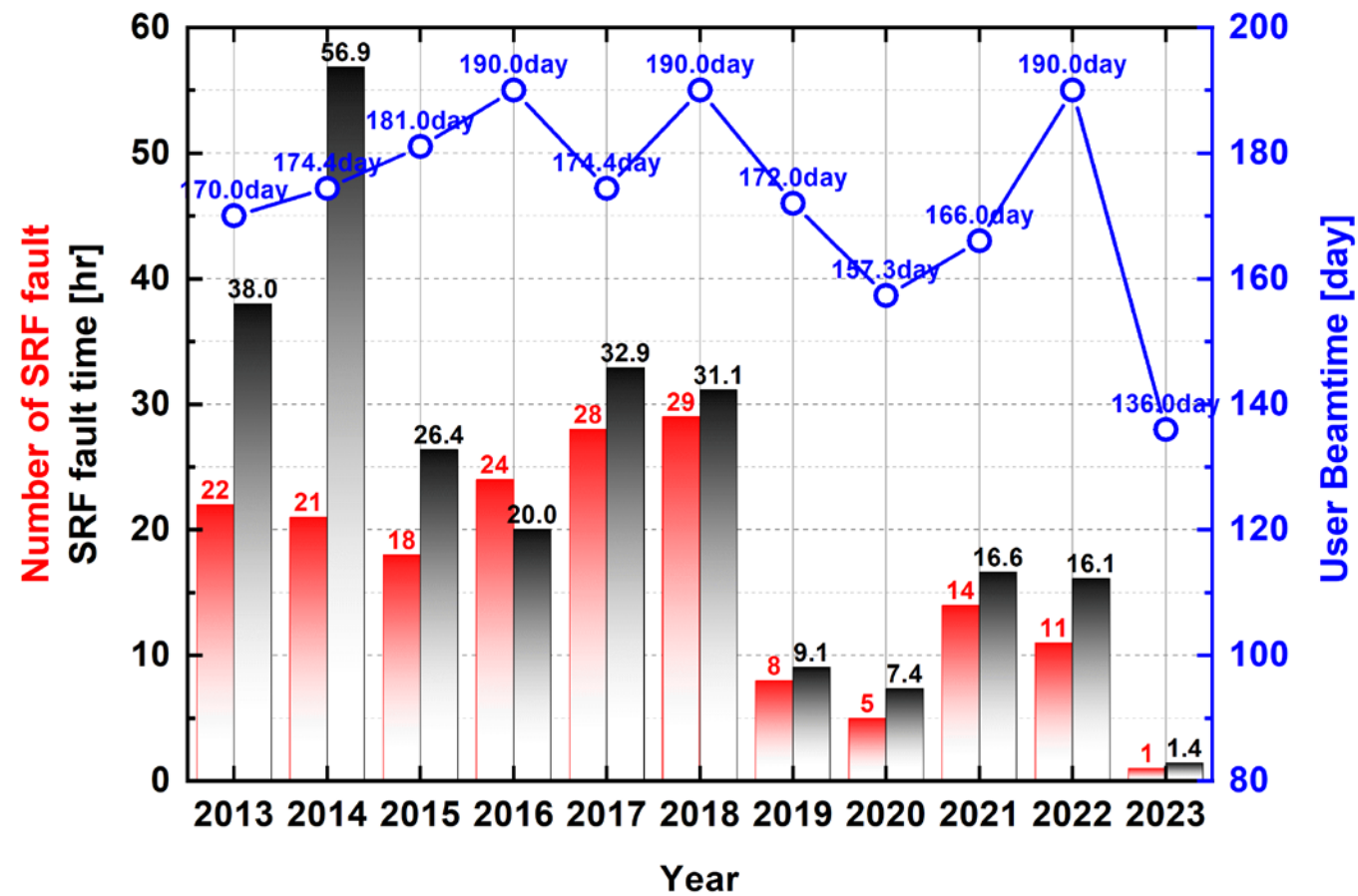
Current Status of Linac & SR RF System

Young-Do Joo

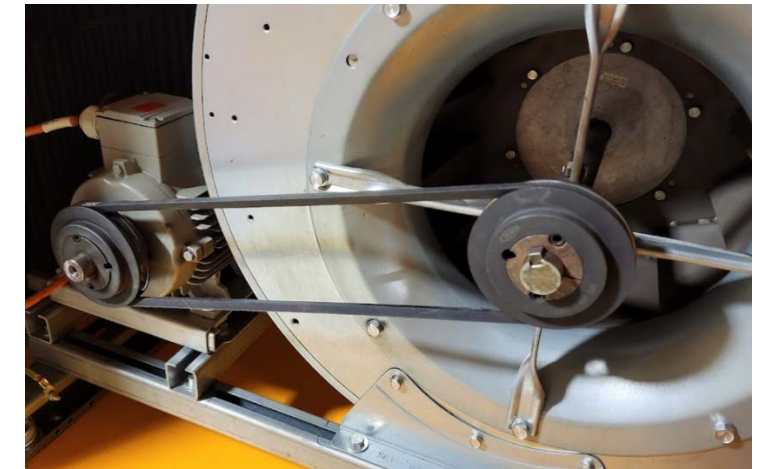
November 13, 2023



PLS-II SRF System Operation Status



Fault #	user-run #	Current [mA]	Date [YYYY.MM.DD]	Fault Time [HH:MM]	Down time [min]	Faults	Components
1	12	250	2023.07.25	05:50 - 07:15	85	KSU2 temperature high interlock- Cooling blower fan belt broken	HPRF
2							



-Only 1 SRF fault happened during the first half of this year

Complete the CM4 installation by replacing CM1

❖ Timeline

- (2022.08) Cryomodule1 (CM1) had a fault of He leak (He vessel to Cavity vacuum)
- (2022.09) CM1 was dismantled
- (2022.12) new CM4 arrived at PAL
- (2023.01) CM1 was sent to RI for repair
- (2023.08) CM4 installation starts
- (2023.10) Beam operation with 250 mA

❖ Beam operation schedule

- Until end of this year : 250 mA
- Before 2024 summer maintenance : 400 mA

❖ Repairing CM1 is on going now

- FAT is scheduled in early December
- CM1 will arrive at PAL in early February
- After warm leak test, CM1 will be stored as a spare



Cryomodule history

	2012		2013		2014		2015~2018	2019		2020		2021		2022		2023		2024~
	1st	2nd	1st	2nd	1st	2nd		1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	
Station1					CM1												CM4	
Station2		CM2																
Station3			CM3										CM3					
Spare																CM4		CM1
Repair								CM3						CM1				

2012.09
CM2 operation starts

2013.02
CM3 operation starts

2014.05
CM1 operation starts

2019.09.26
CM3 cavity vacuum leak

2022.08.22
CM1 cavity vacuum leak

2021.05
CM3 arrived at PAL

2022.12
CM4 arrived at PAL

2021.10
CM3 operation starts

2023.10
CM4 operation start

2024.02
CM1 will arrive at PAL

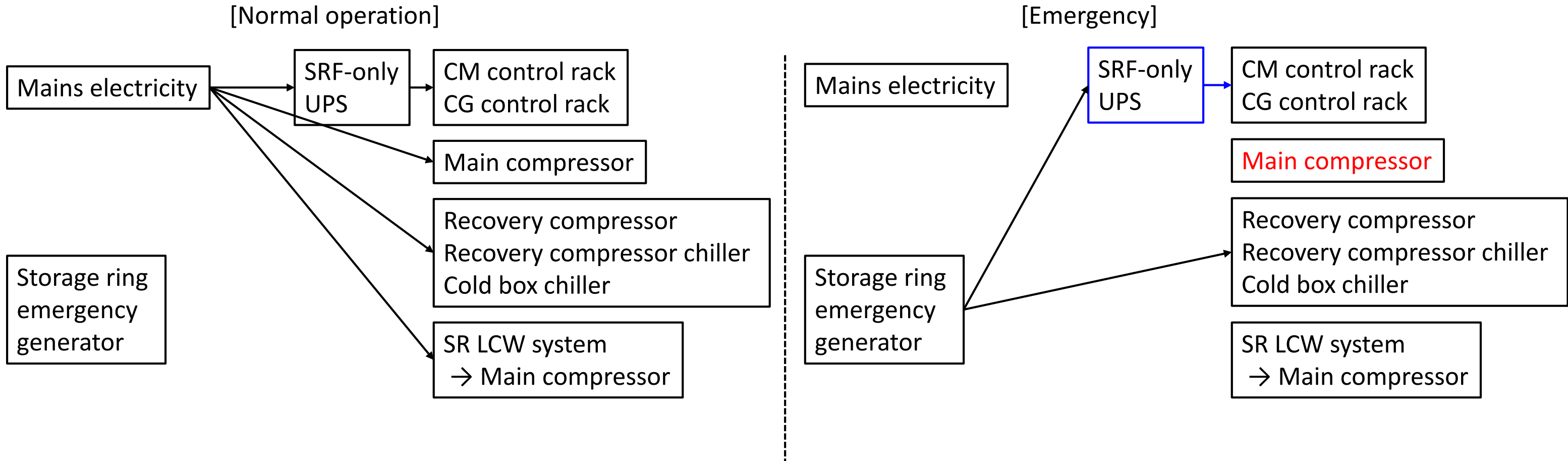
Total 4 CMs : 3 active, 1 spare

Only needs 7~8 weeks to replace CM, He vessel conditioning and RF conditioning

Uninterruptible systems for SRF

❖ Before

- Only Cryogenic and Cryomodule control system was uninterruptible
- If there occurs a voltage drop or power failure with a large enough impact to stop the main compressor, the main compressor will stop. This requires a lot of time to recover.



Uninterruptible systems for SRF

❖ Building Uninterruptible system

-SRF-only UPS

30 kVA (x2 in parallel) → 500 kVA (x2 in parallel) : Enough capacity to operate main compressor during 15 min.

-SRF-only Emergency generator

A new SRF-only emergency generator (750 kW) : can be activated in 30 seconds

-SRF-only LCW system

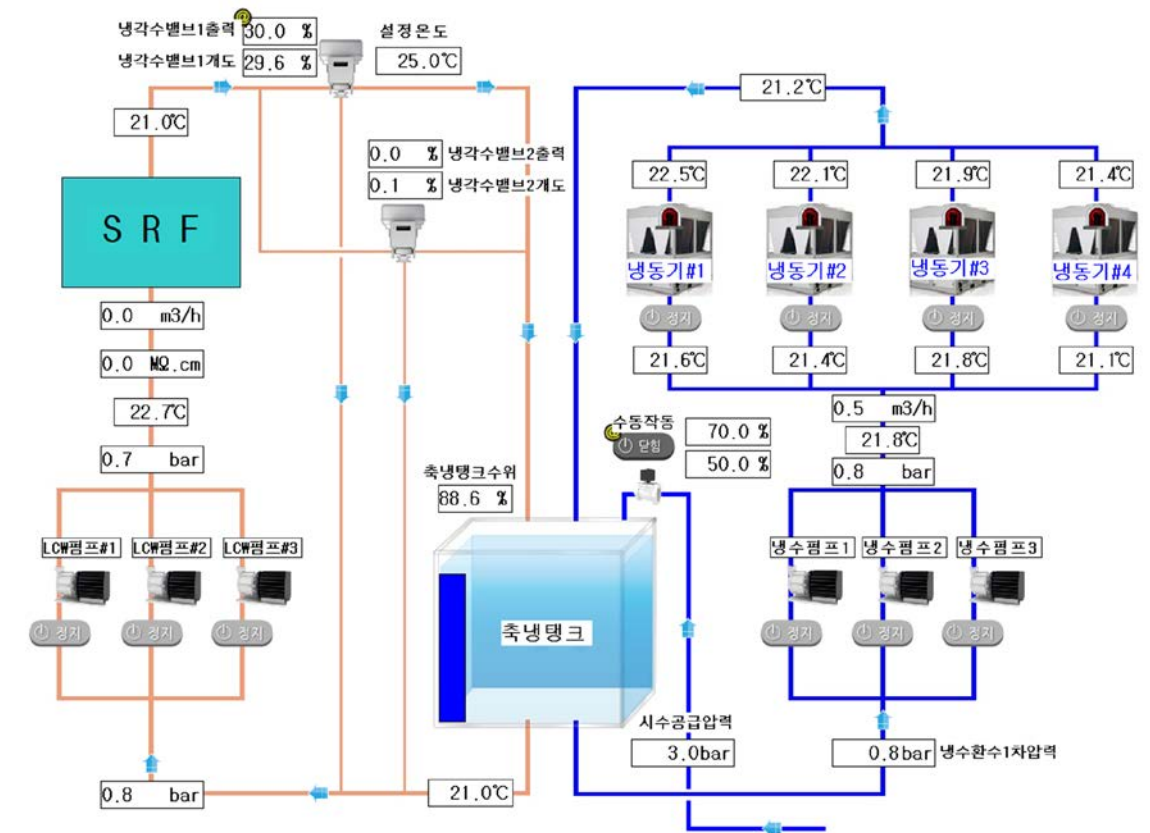
LCW pump system and LCW cooling system for main compressor



SRF-only UPS



SRF-only Emergency generator



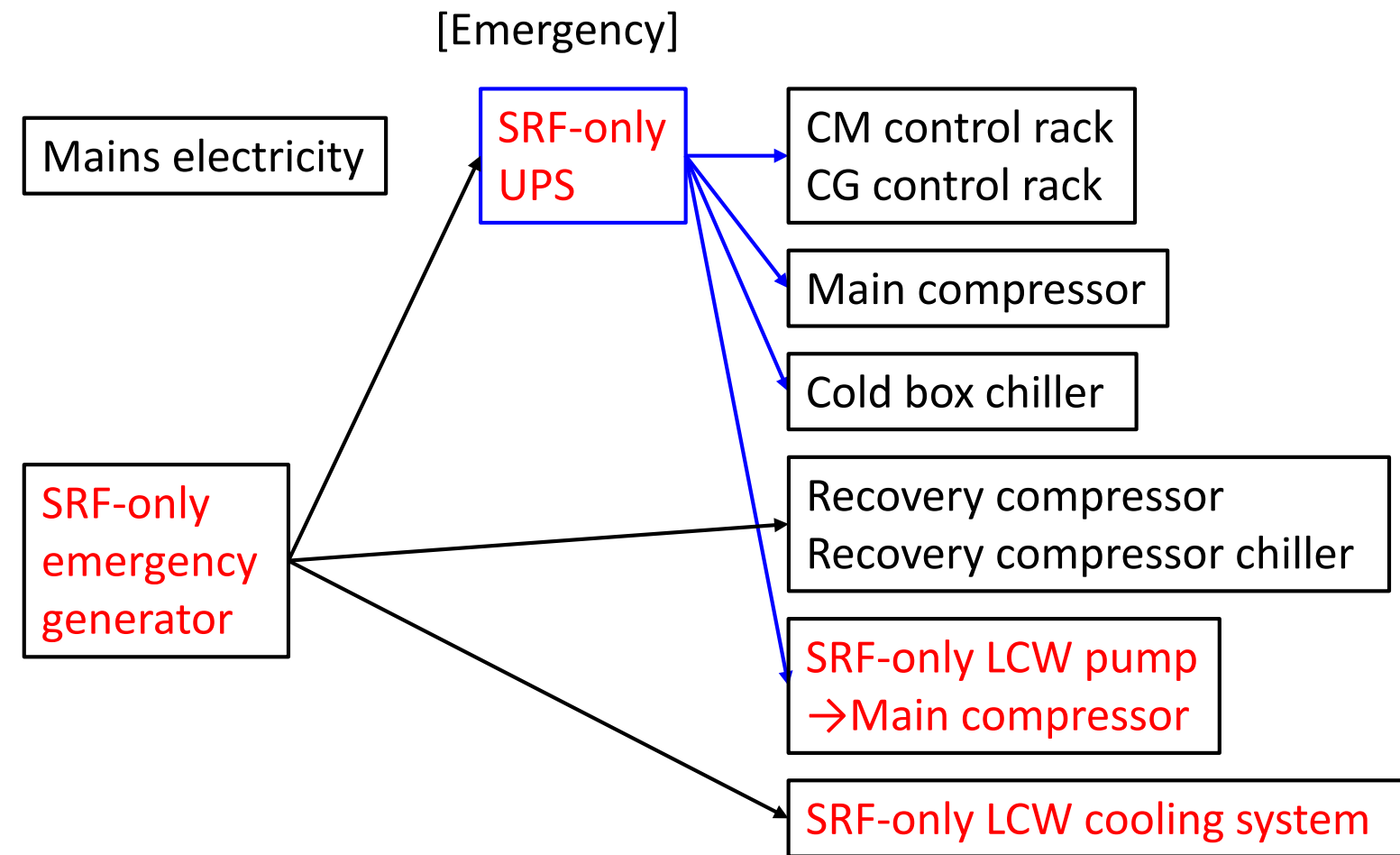
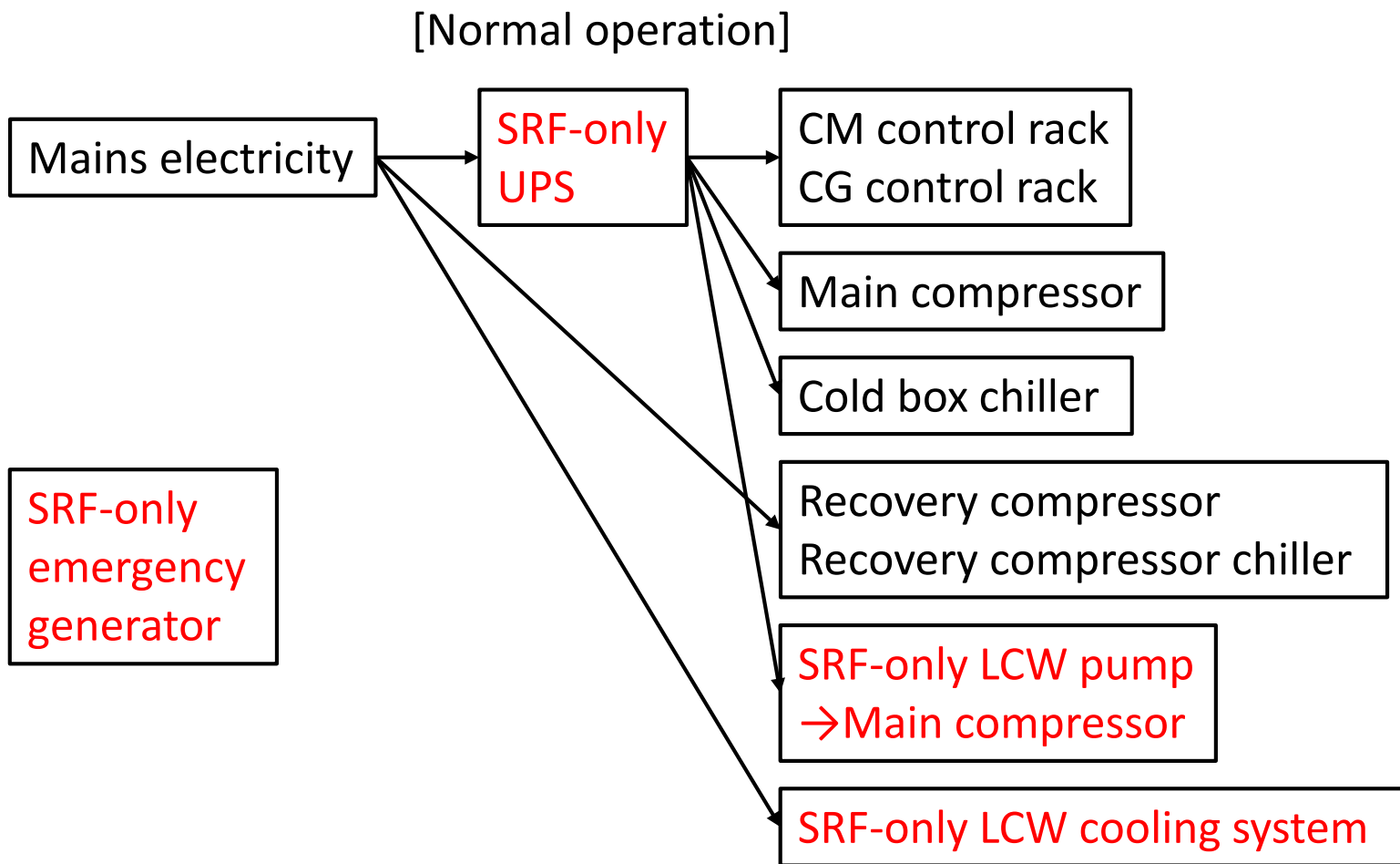
SRF-only LCW system

Uninterruptible systems for SRF

❖ After

- Full electricity system is uninterruptible
- SRF LCW system can stand alone operation

Full uninterruptible system will operate from next year

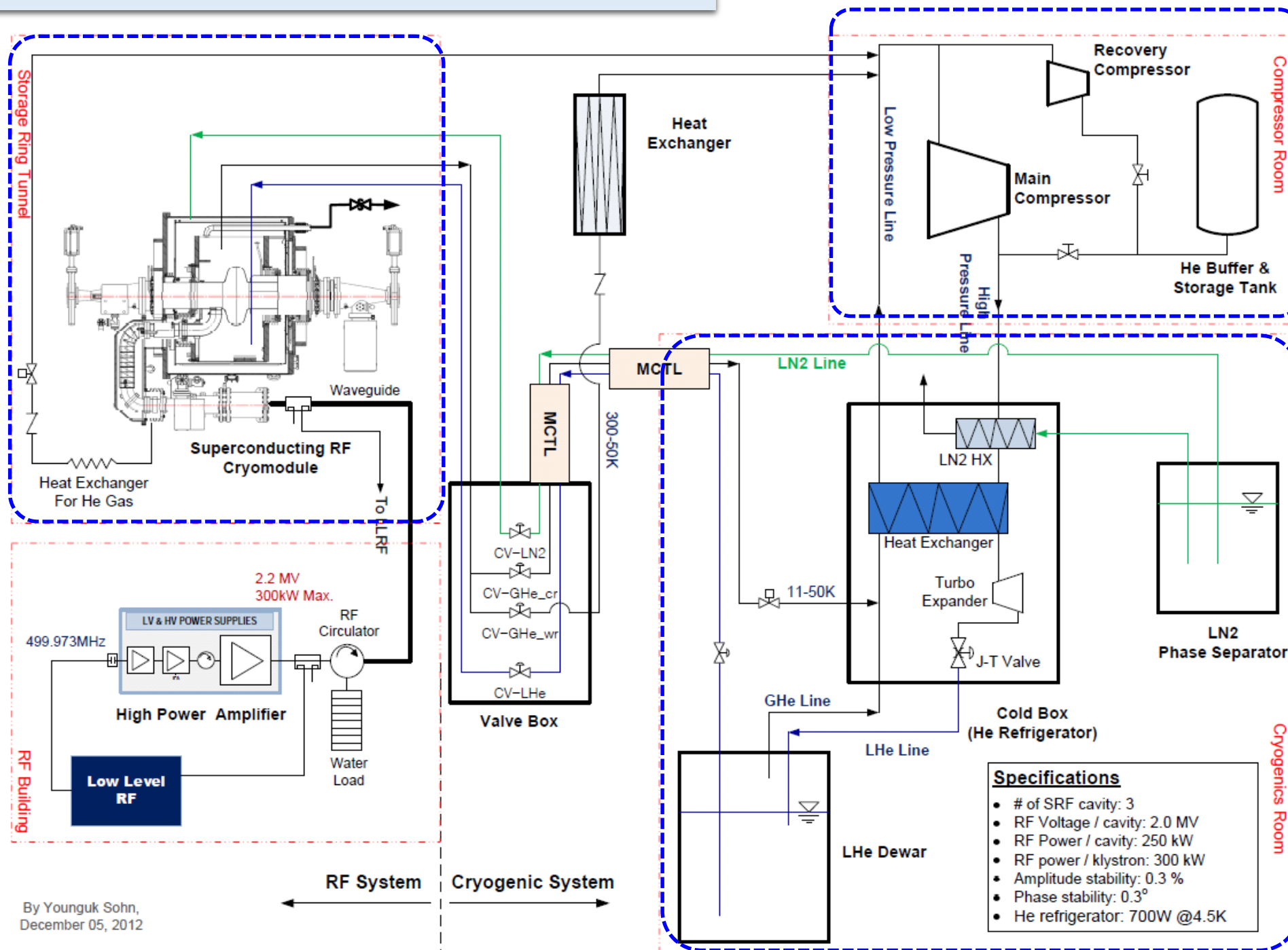


Summary of big faults in SRF system

Cryomodule

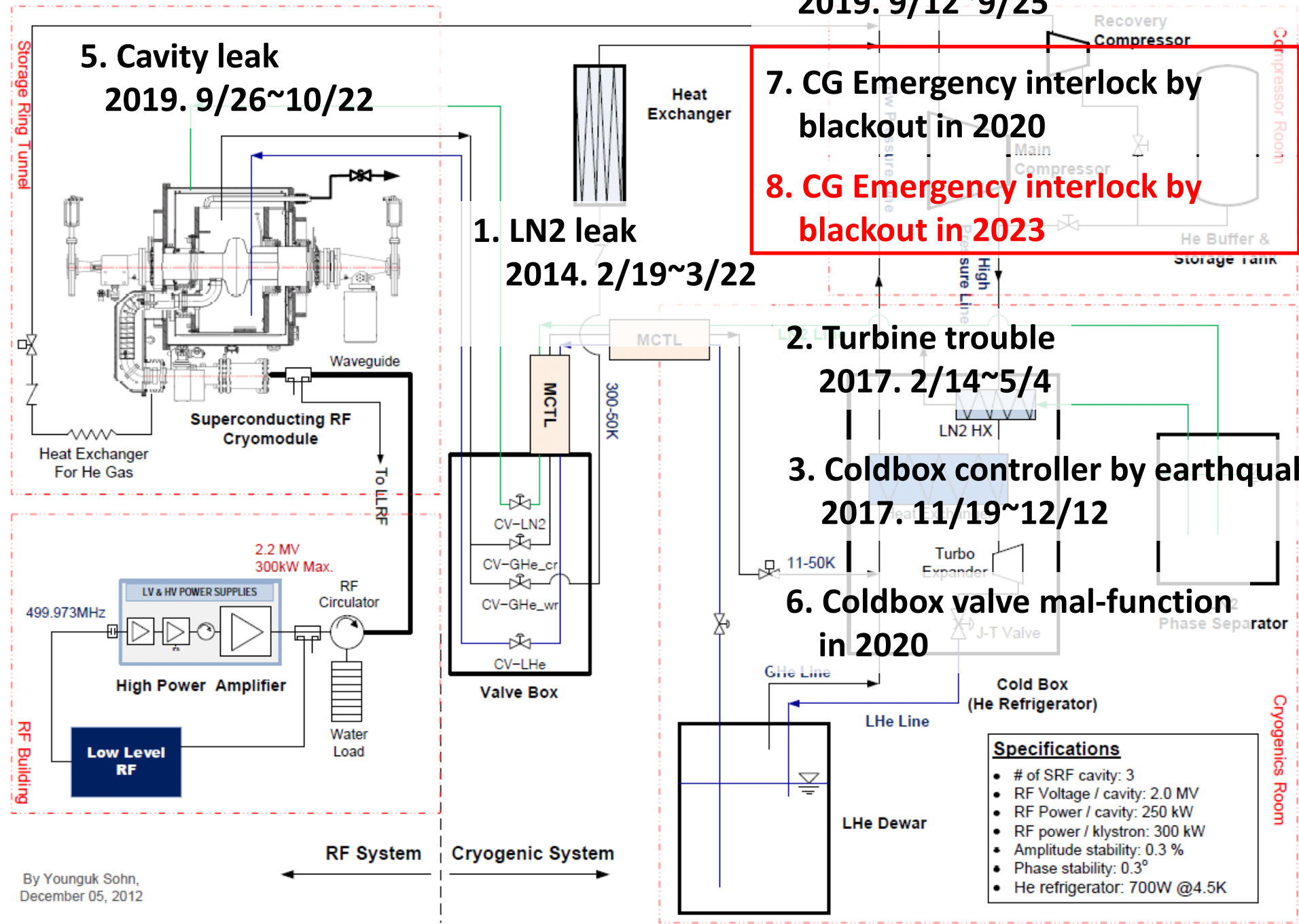
Compressor

Coldbox



By Younguk Sohn,
December 05, 2012

Summary of big faults in SRF system



Problems with blackout should be prevented

By Younguk Sohn,
December 05, 2012

2A Accelerator column replacement

❖ Accelerator columns (two) at 2A station were replaced

- Of the 46 accelerator tubes in the linear accelerator, 42 are IHEP-made accelerator tubes (used for about 30 years), and 4 are Mitsubishi accelerator columns (2 each for sections 12A and 12B).
- MK2A has frequent tunnel vacuum faults even at lower high voltage (36 kV) than other modules, making it difficult to supply enough RF power. This is due to frequent vacuum interlock caused by arcing in the accelerator column.
- Replacing two accelerator columns of MK2A with spare (Mitsubishi) to increase RF Power

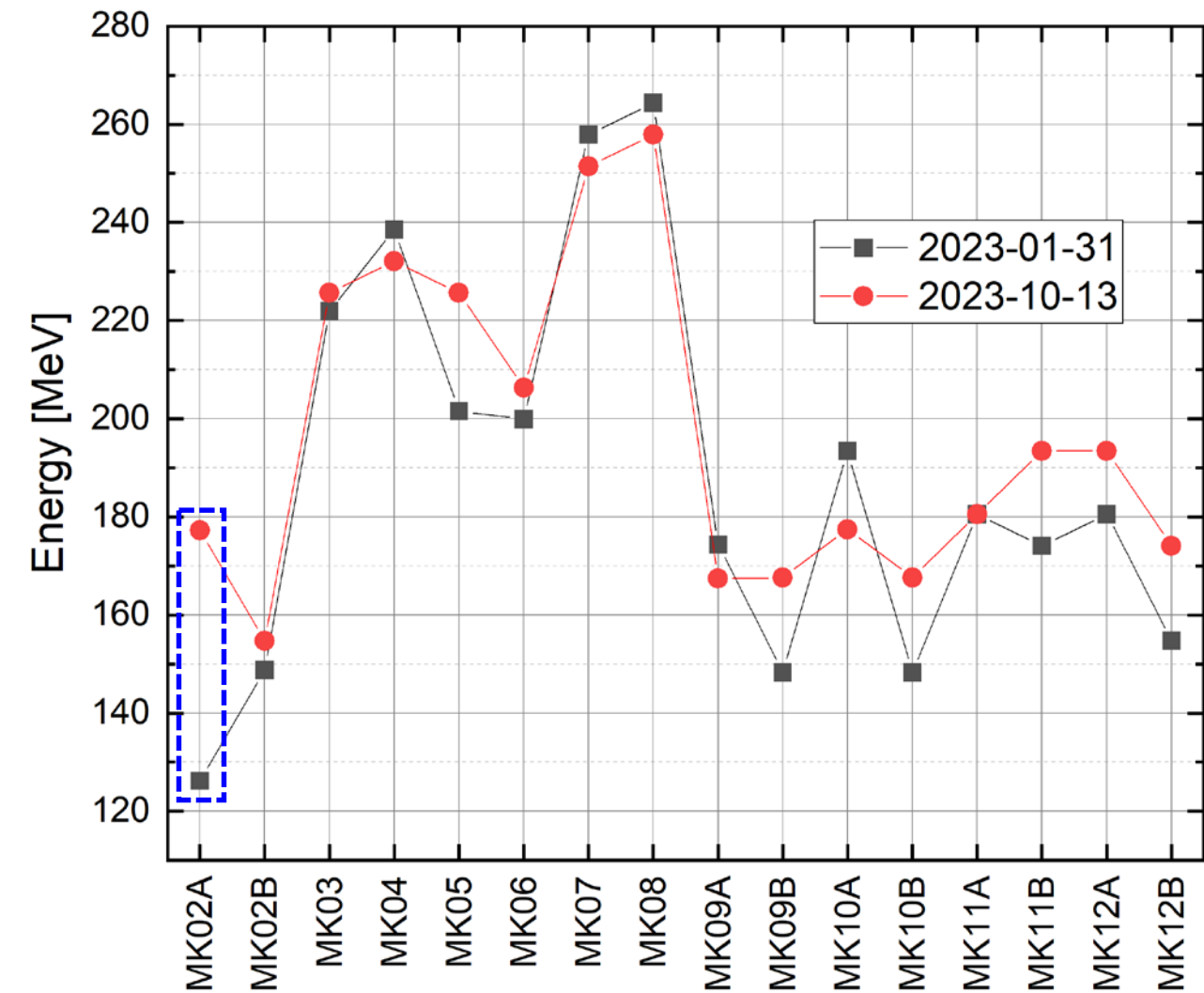


2A Accelerator column replacement

❖ Before replacement (IHEP)



❖ After replacement (Mitsubishi)



-Beam energy of each station was measured by turn off MK one by one

Thanks to:

PLS-II Accelerator Technology Team

