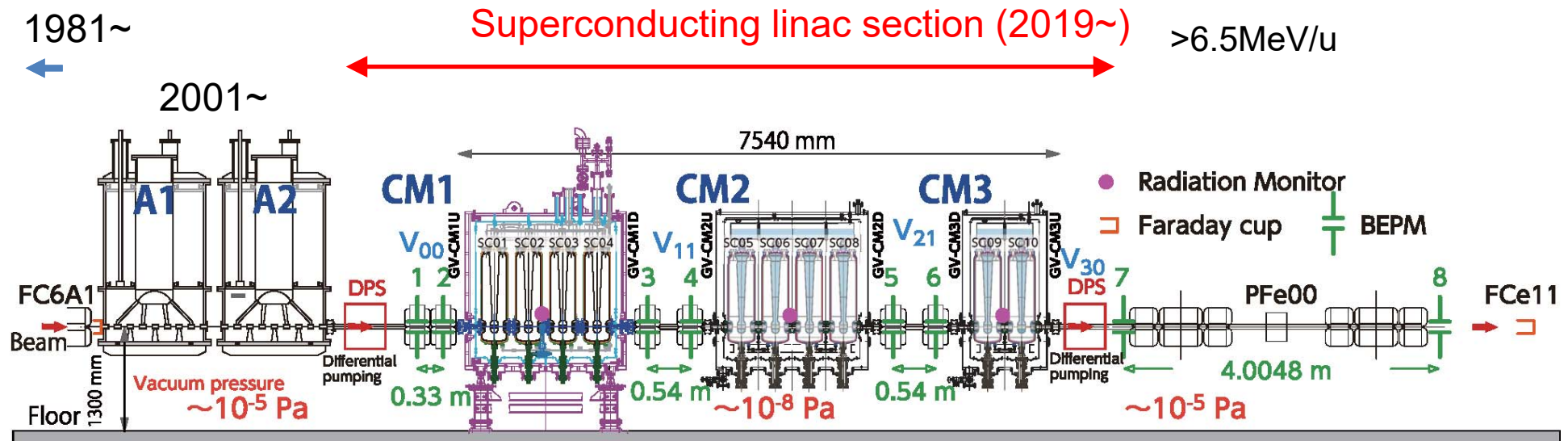


Operational status of SRILAC at RIKEN

Kazunari Yamada, RIKEN Nishina Center

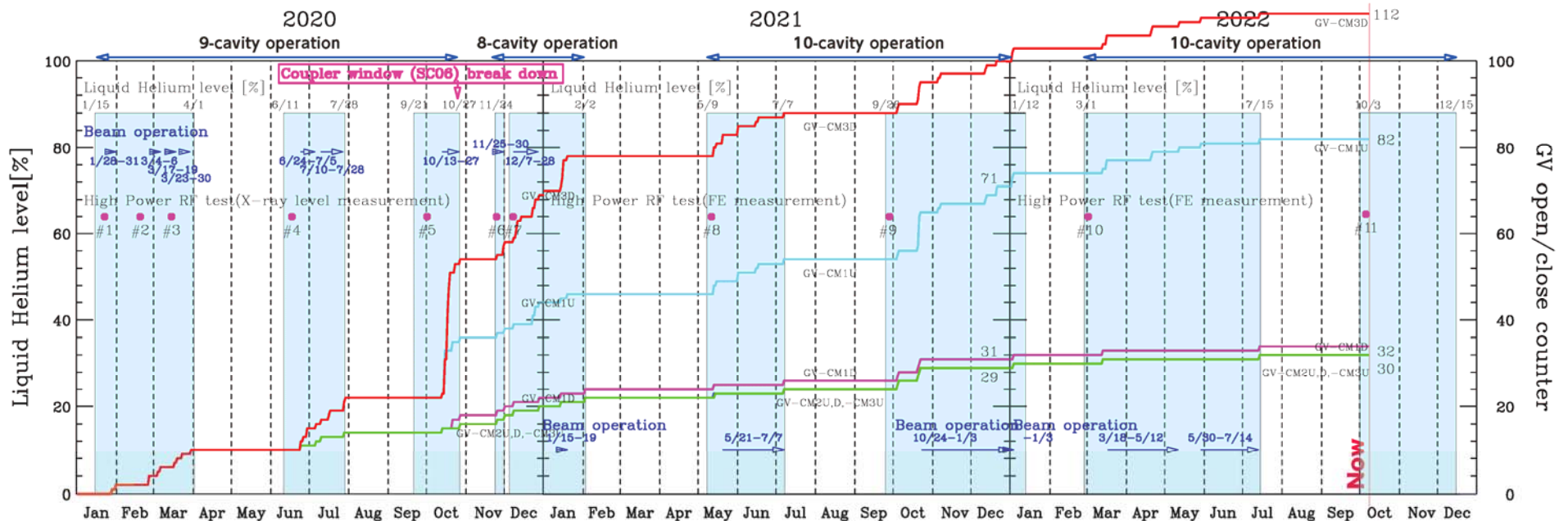


Entire layout of the superconducting heavy-ion linear accelerator at RIKEN

- 10 superconducting QWRs arranged into three cryomodules
- Located downstream of the old room temperature linac section
- Room temperature quadrupoles for focusing elements

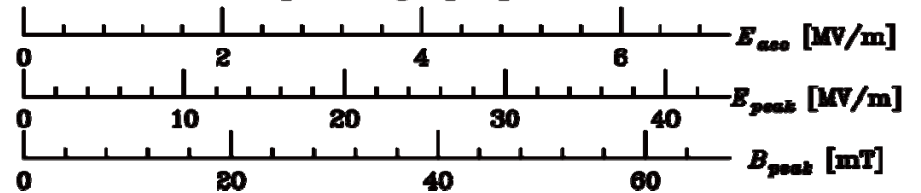
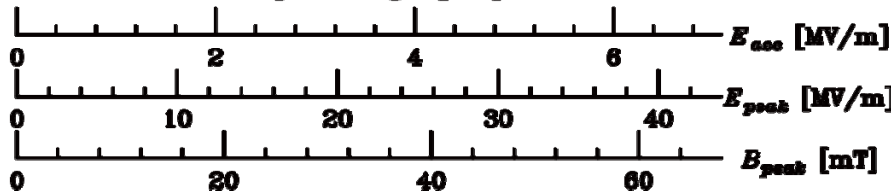
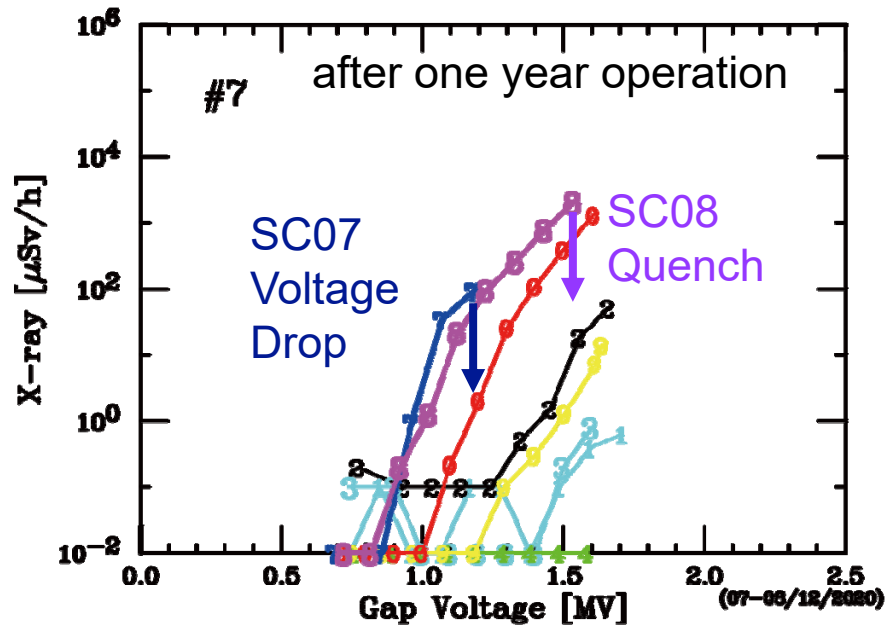
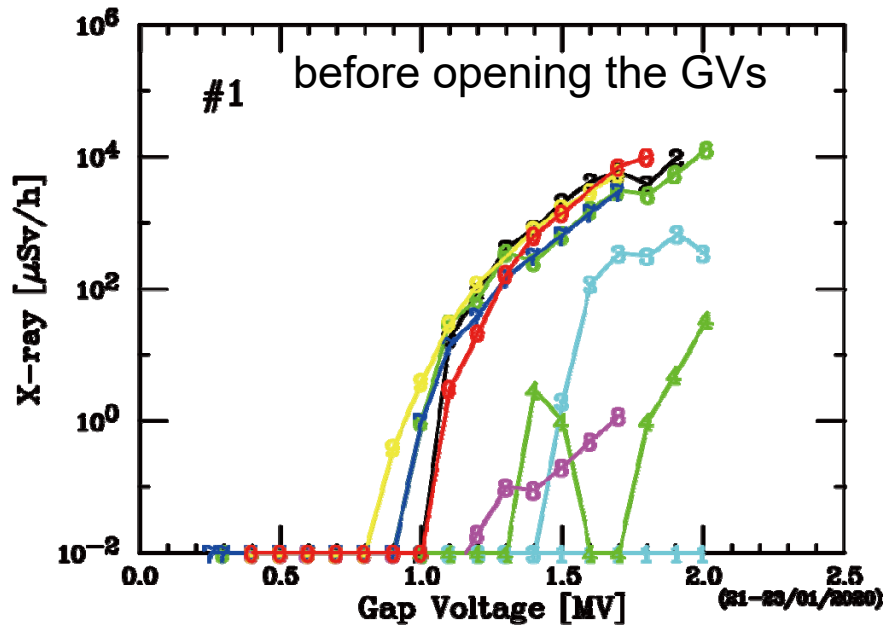
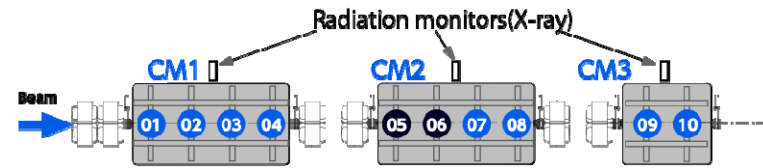
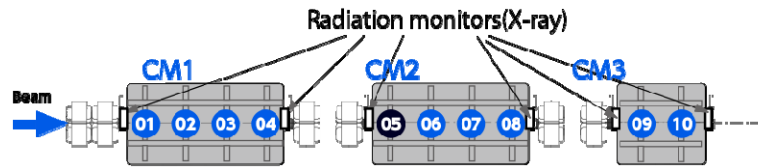
Operation history of SRILAC

- After the beam acceleration test for the first time in January 2020, user beam service was initiated.
- We have experienced vacuum problem with coupler windows twice (SC05, SC06).
- So far cryomodules were cooled for eight times and beam services were made keeping the beam loss as low as possible.
- Overall availability of the SRILAC including RT section was more than 90% (SRF 1%).
- Degradation of cavity performance is significant.



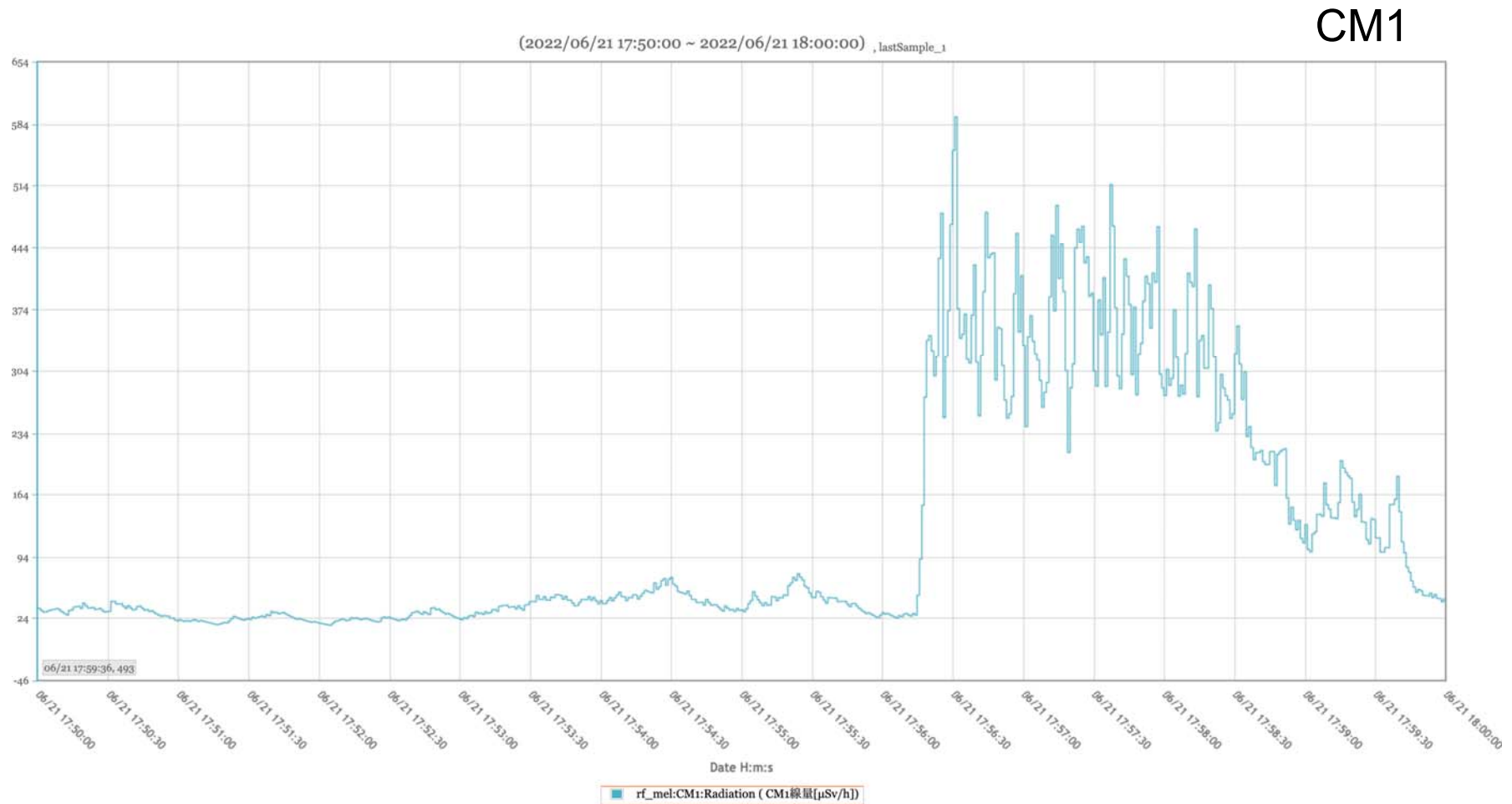
Comparison of Field Emission Levels

- After an impact of SC06 coupler-window-break emission levels of SC07, SC08 became higher than those of the measurement #1.
- Situation of degradation of SC05, 06, 07, 08 (CM2) is significant.



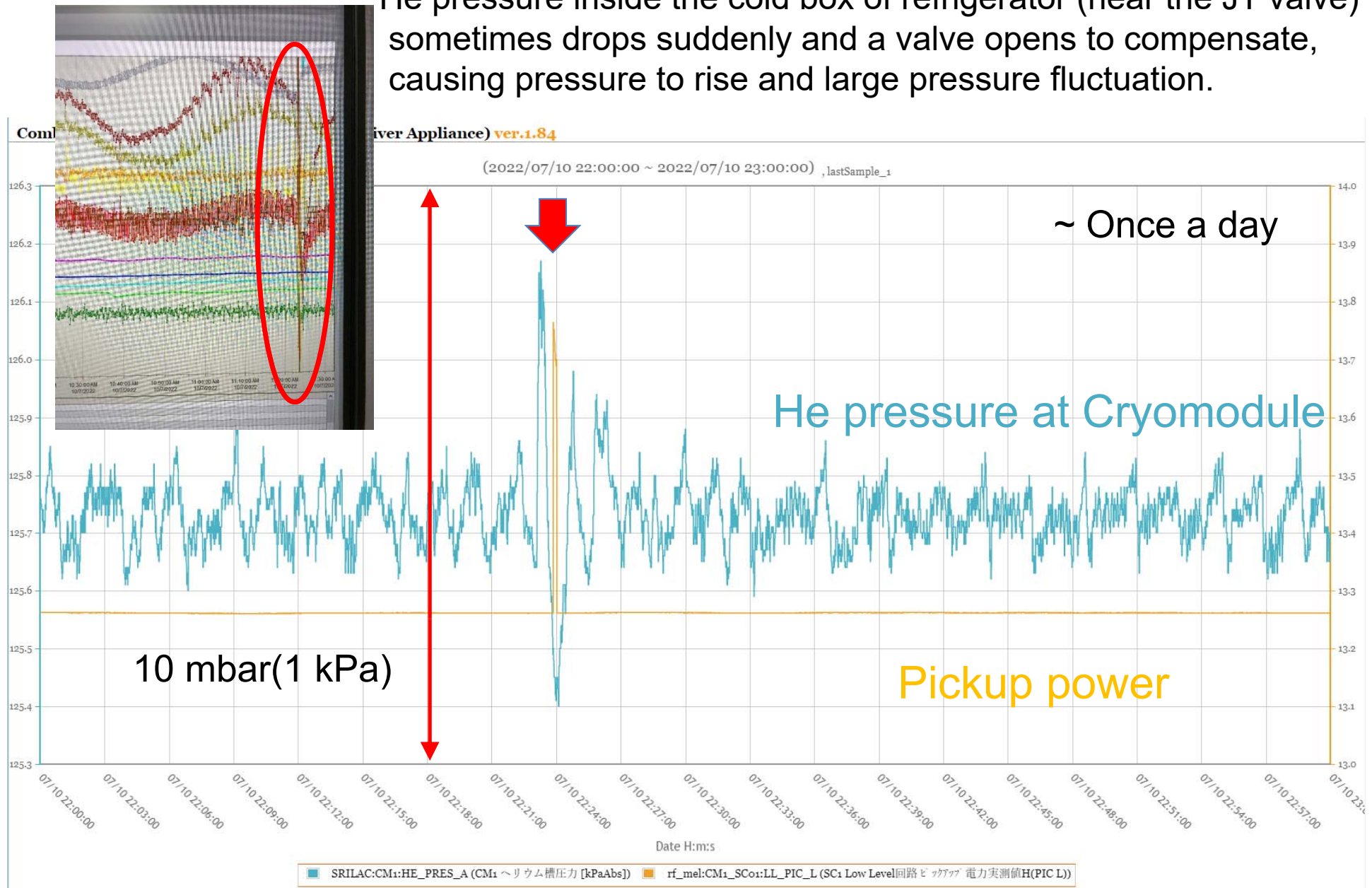
X-ray emission from cavities

- Sudden increase of emission level was observed for CM1 during beam services.
- No events such as increased beam loss or gate valve opening/closing at this time.
- Emission of SC01 was increased.



Out of voltage regulation due to He pressure fluctuations

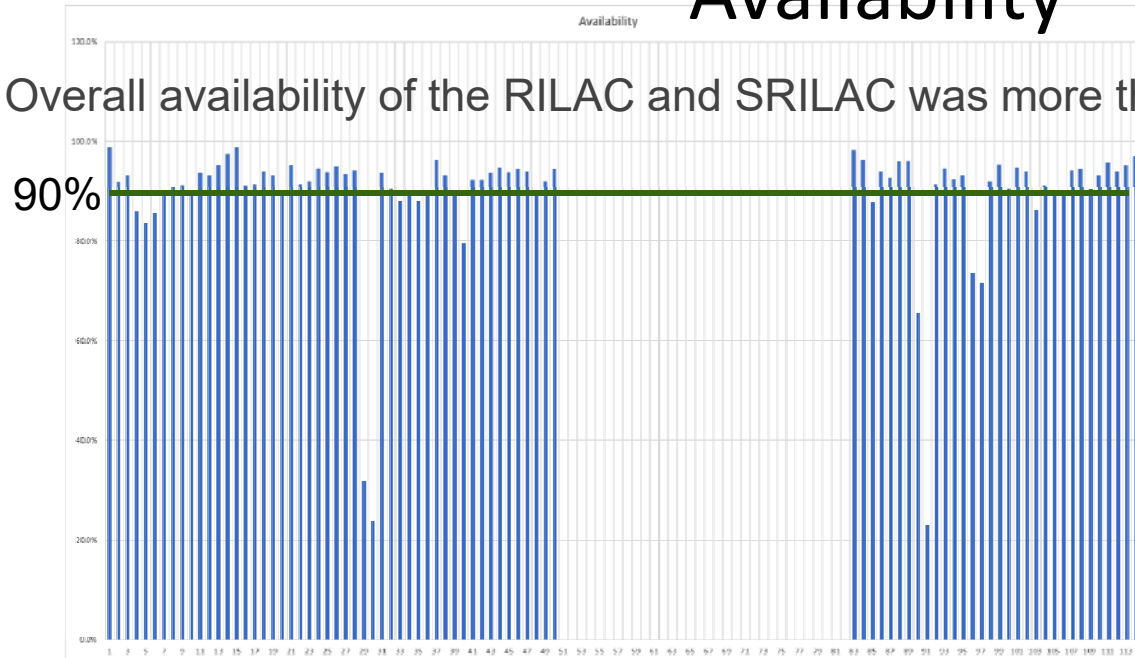
He pressure inside the cold box of refrigerator (near the JT valve) sometimes drops suddenly and a valve opens to compensate, causing pressure to rise and large pressure fluctuation.



Backups

Availability

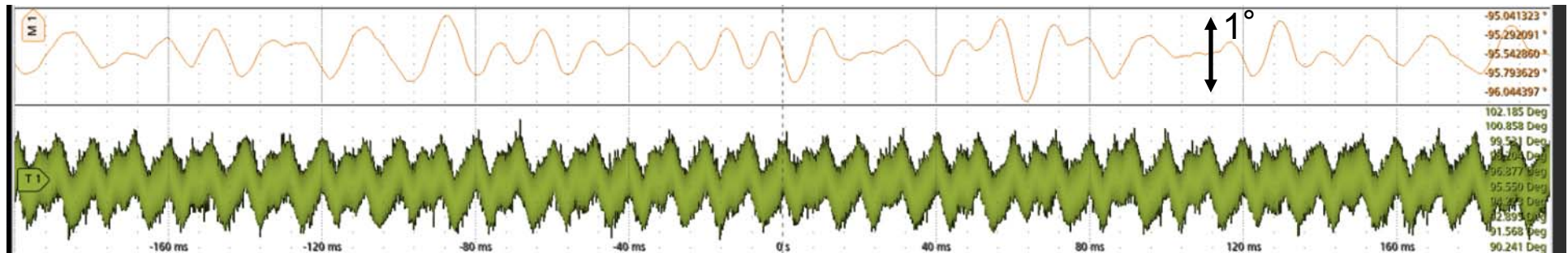
- Overall availability of the RILAC and SRILAC was more than 90%.



series 7

Daily inspection of HPGR
 RILAC RF error 0.9%
 SRILAC RF error 1.0%
 IS restart, tuning 2.7%

- Recovery of the cavity voltage sometimes took 20 min. because leaked rf field adjacent cavity affected to re-energize the cavity.
- Cavities talk each other? -
- LLRF looked to work well. (Phase error is less than $\pm 1^\circ$)



X-ray emission from cavities

- Sudden increase of emission level was observed for CM1 during beam services.
- After that the performance of SC01 was degraded.

