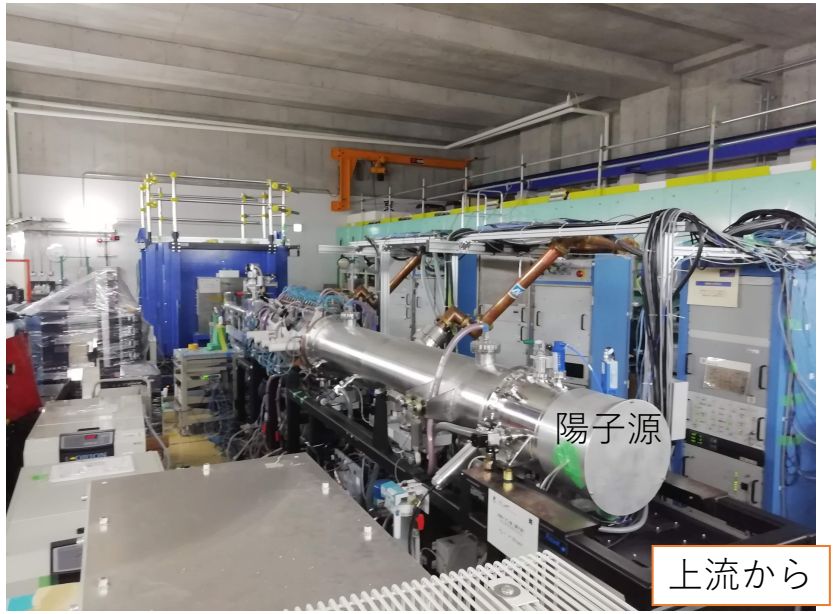
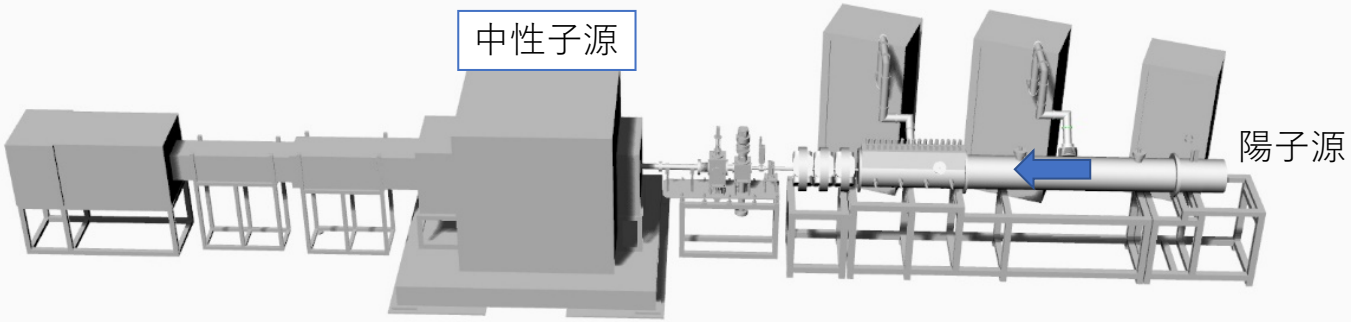
Radiation Hardness Test of μ-Coax cable at RANS

RIKEN/RBRC

Itaru Nakagawa

小型中性子源：RANS
(RIKEN Accelerator-driven compact Neutron Source)

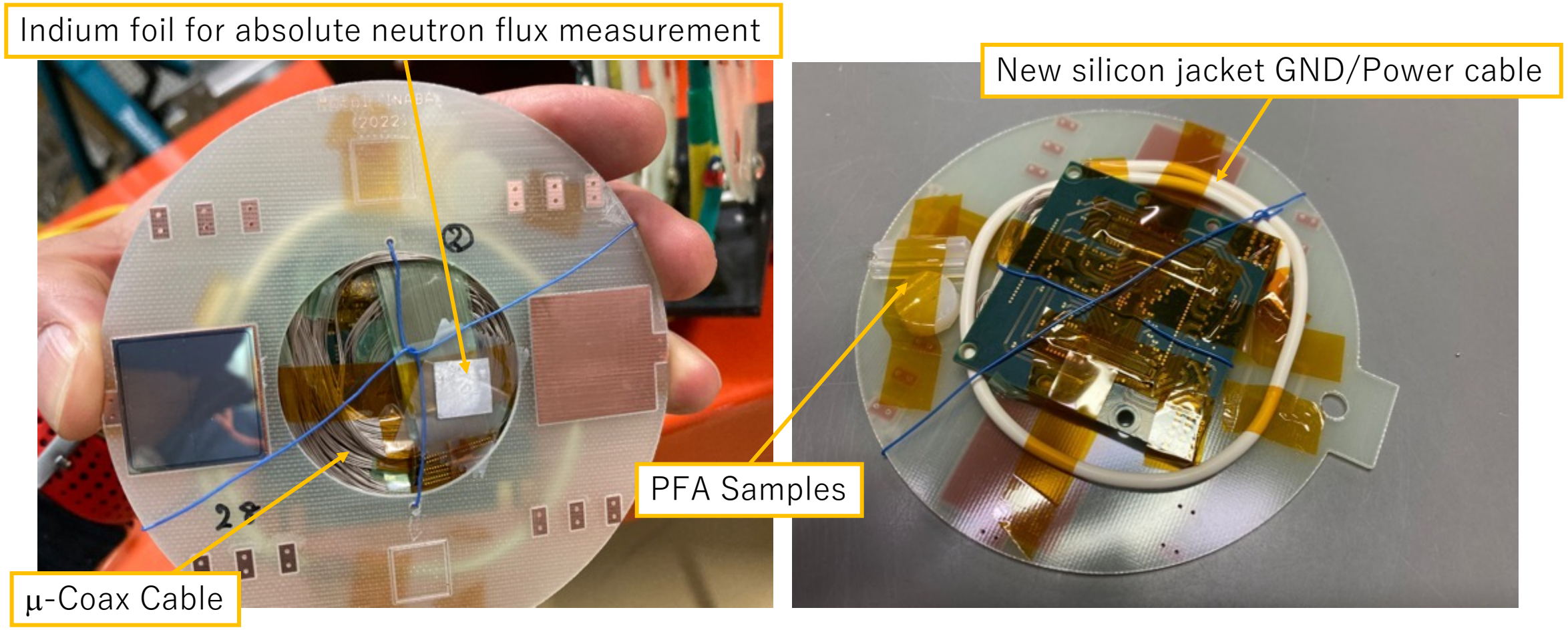




Beam Time for FoCAL@ALICE project in March 3-4, 2022. (10 hours)

2

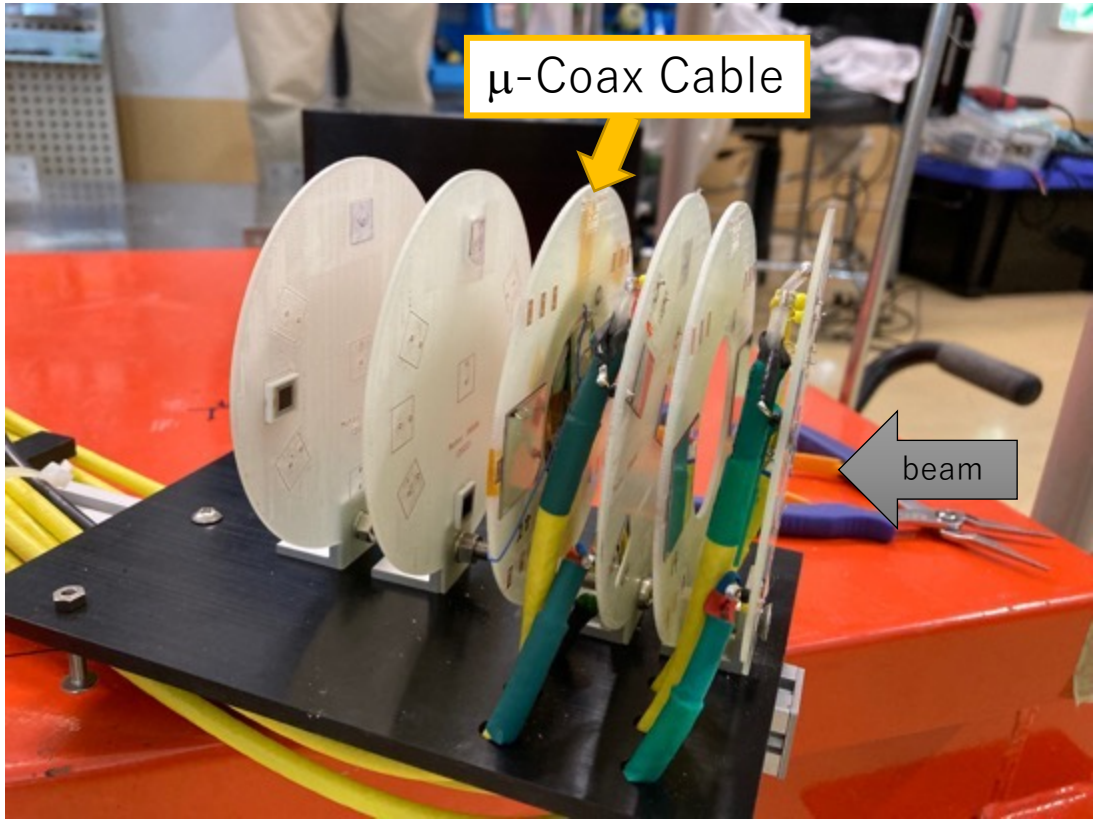
Prototype-I Cable Setup

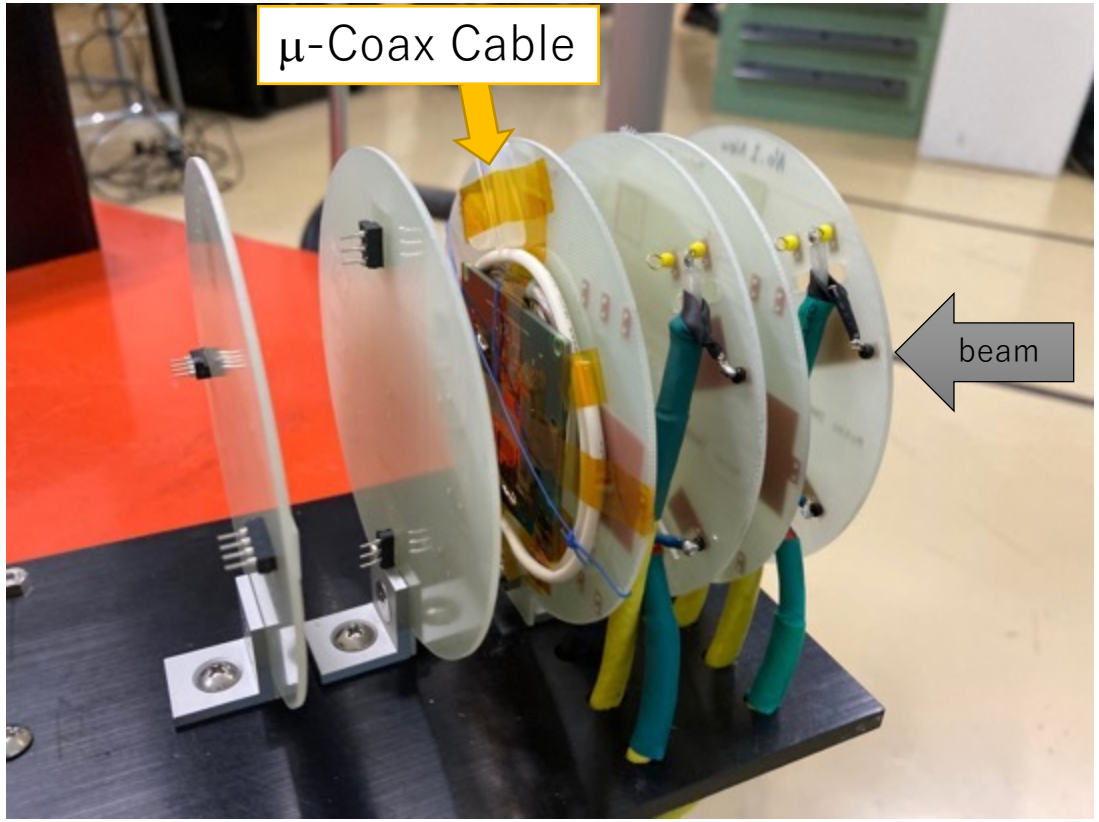


Attached to the disk (Front View)

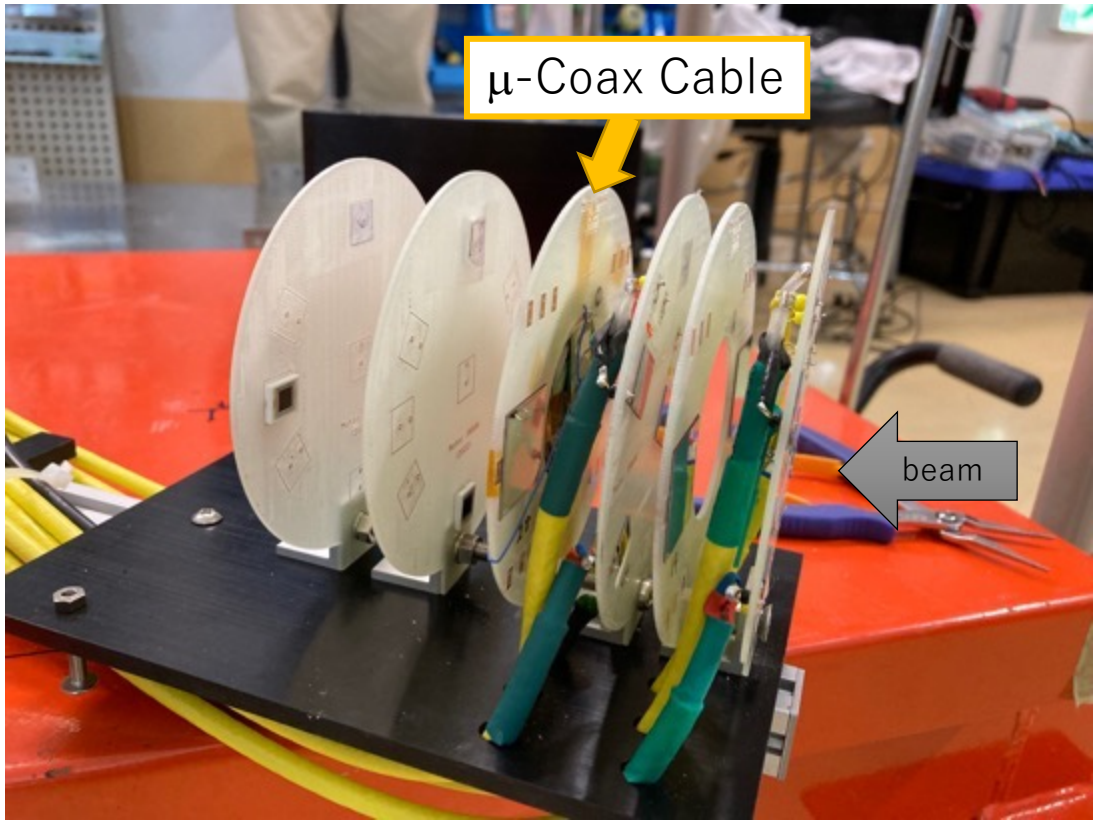
Attached to the disk (Back View)

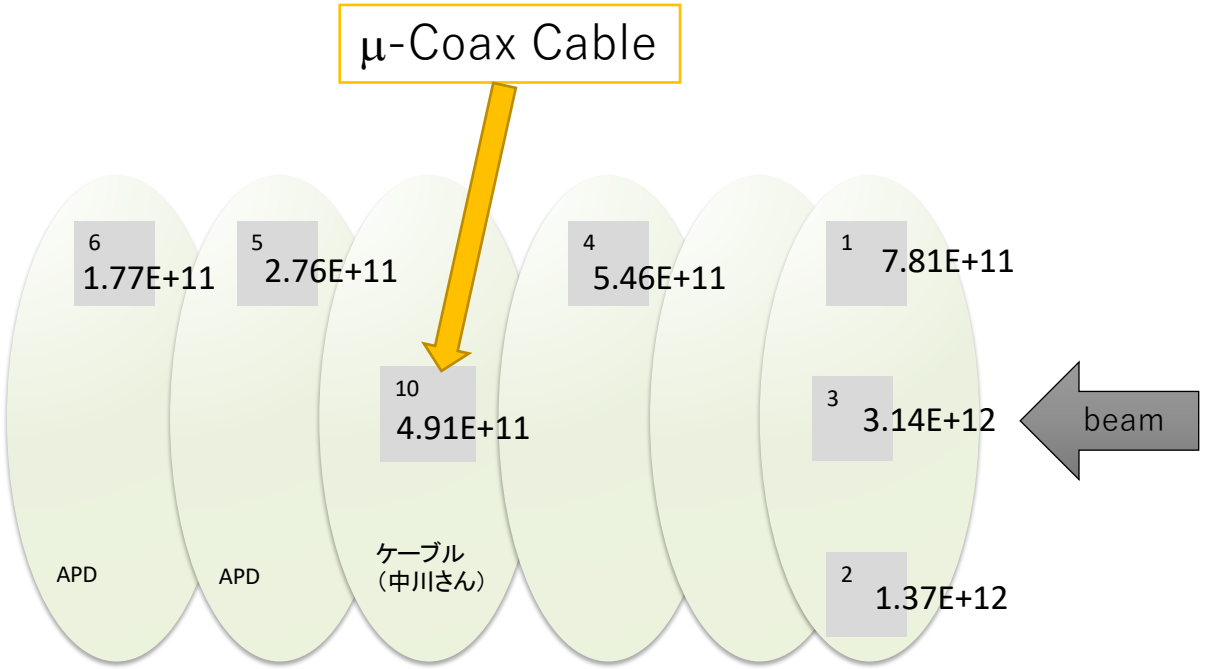
Disk Mount Setup with FoCAL Sensors





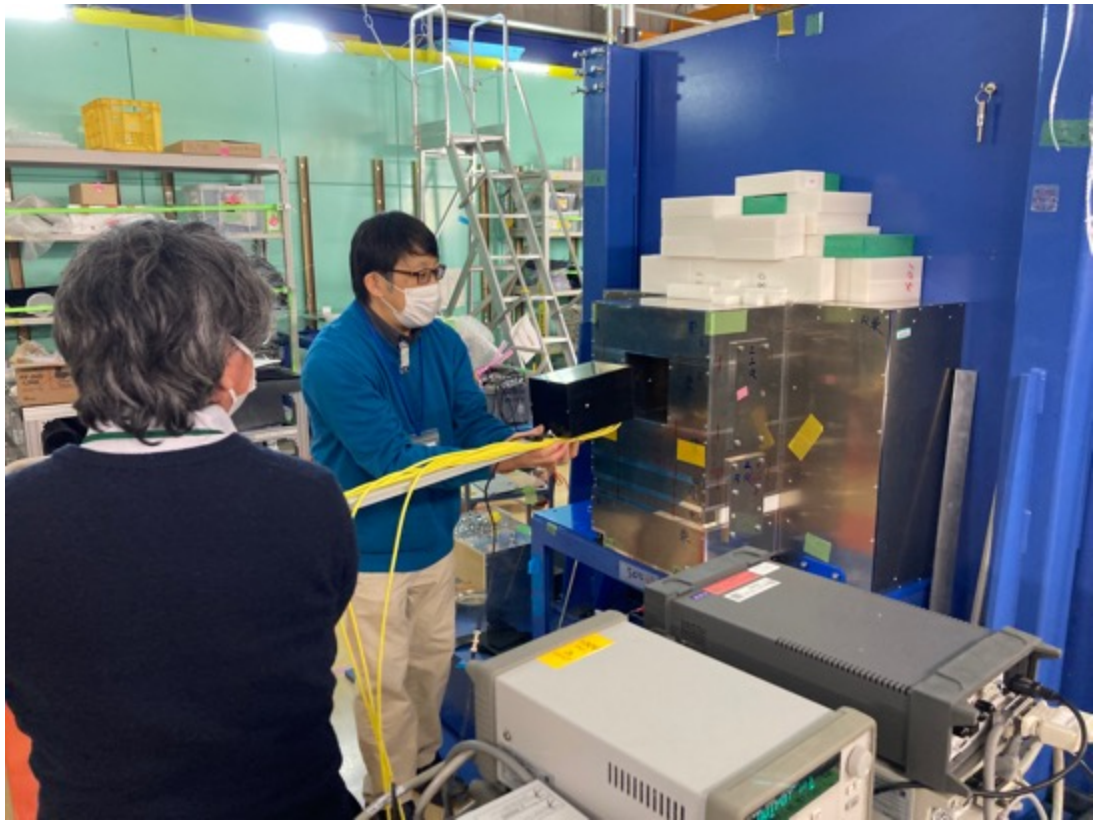
Neutron Flux Measurement by Indium





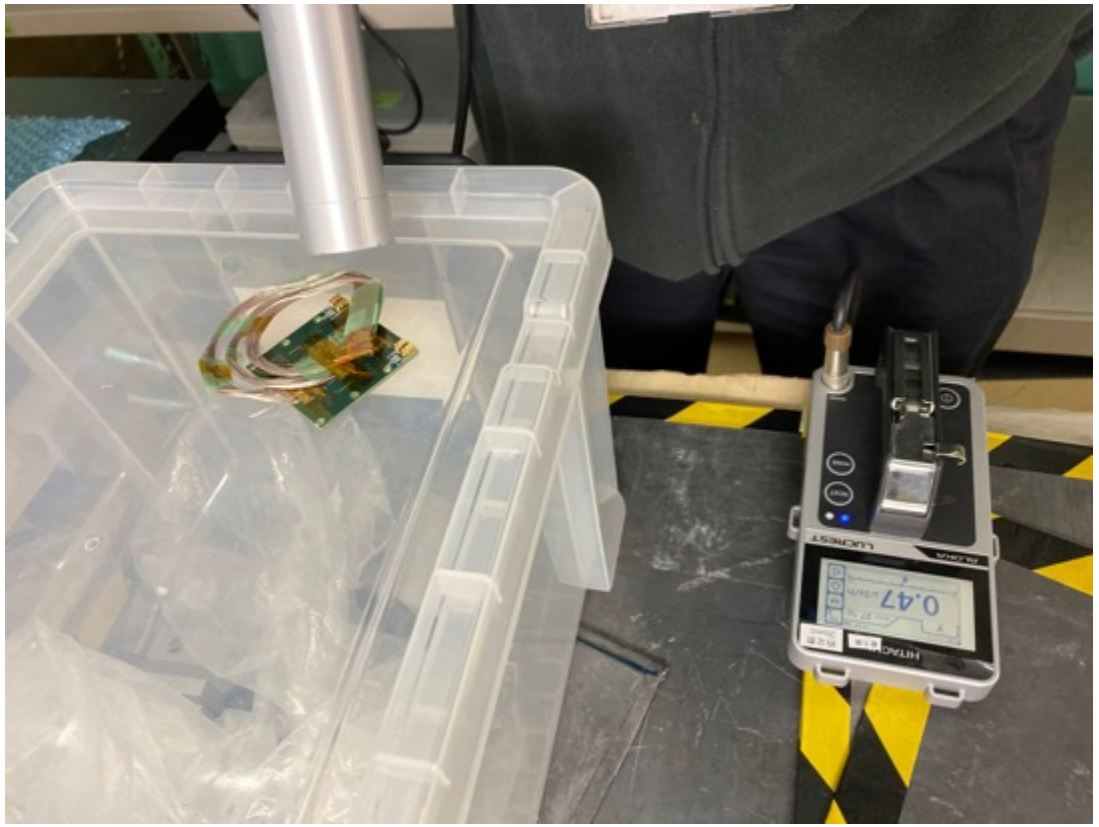
Irradiated 9 hours total.
Total Neutron Flux = 1.7×10^{13} neutrons

Radio Activated Samples



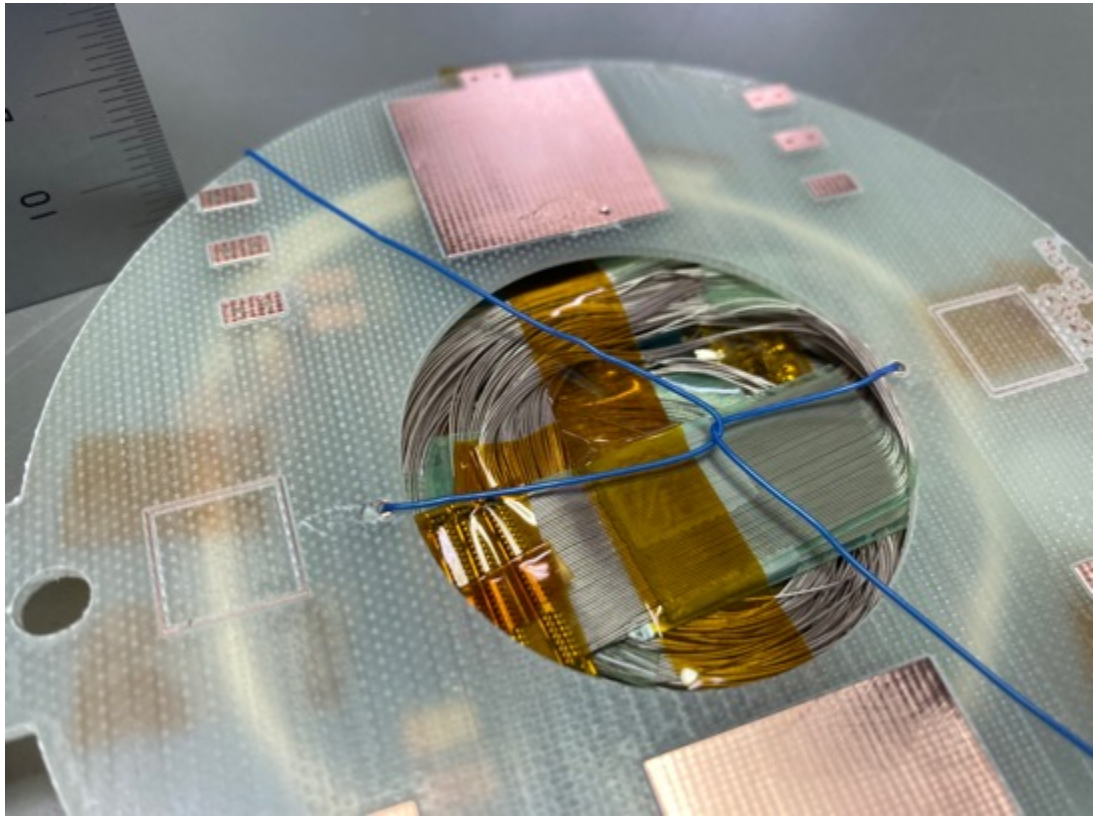
- Cooling down since 3/8~9 9 hours irradiation.
- Not yet ready to take out of the radiation area.

Radio Activation Survey of μ-Coax

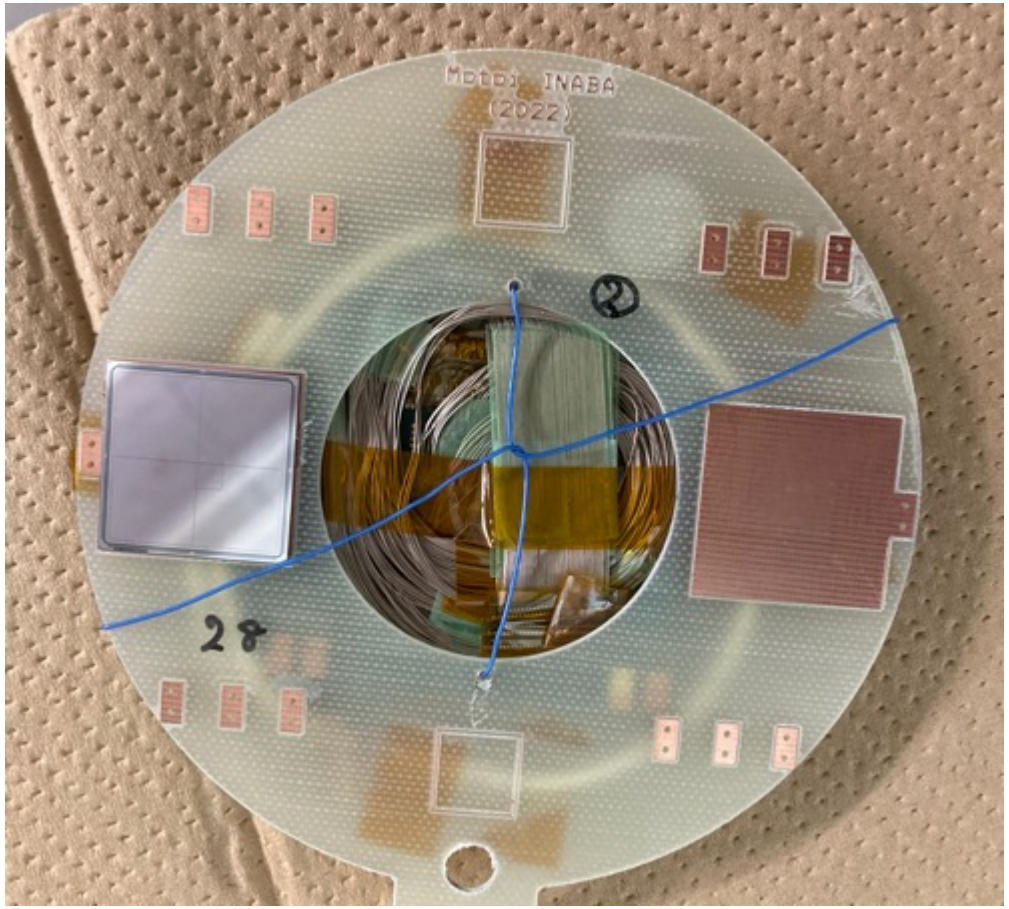


- Survey was done 3/9 (Thursday)
- Worst spot ~ 0.7 μSv.
- Probably it is ready to taken out of the radiation area on next Monday

Radiation Damage



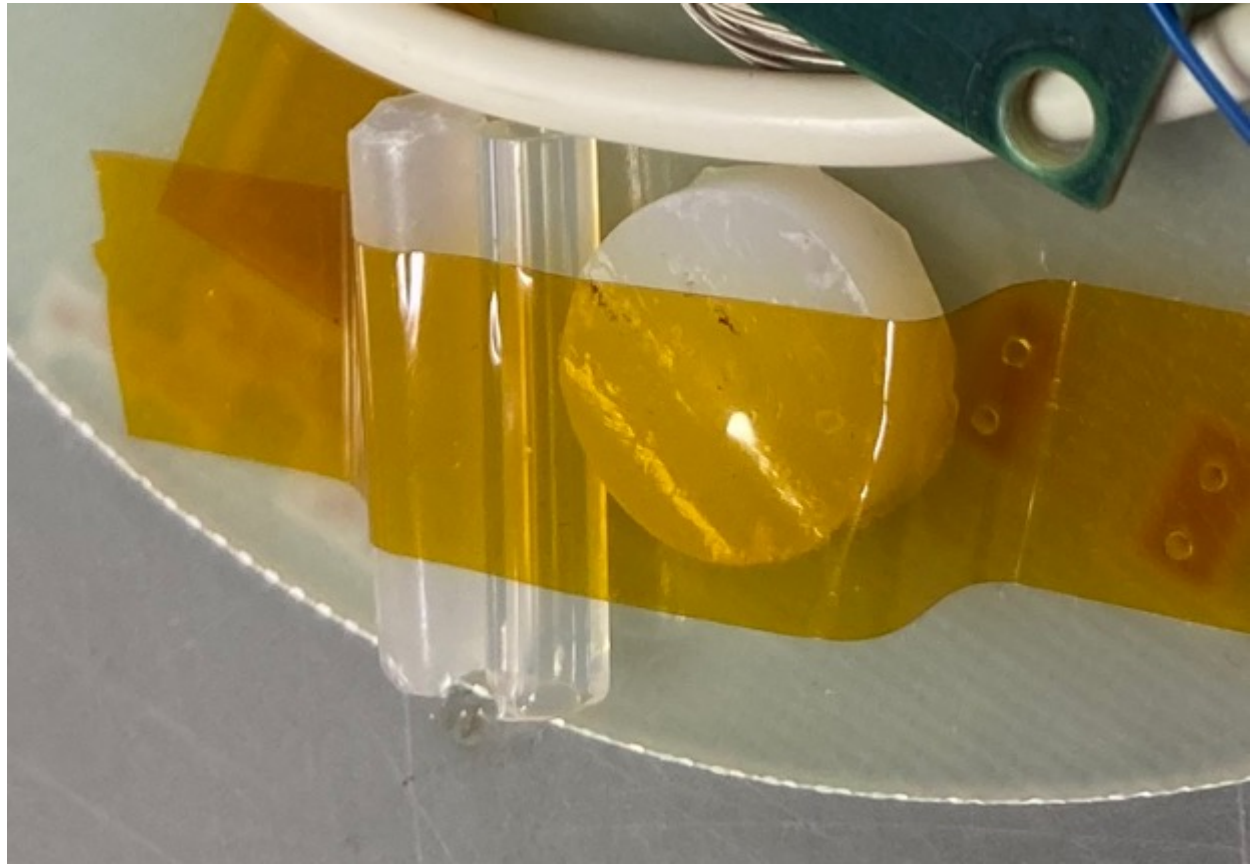
Before



After

Radiation Damage

Before

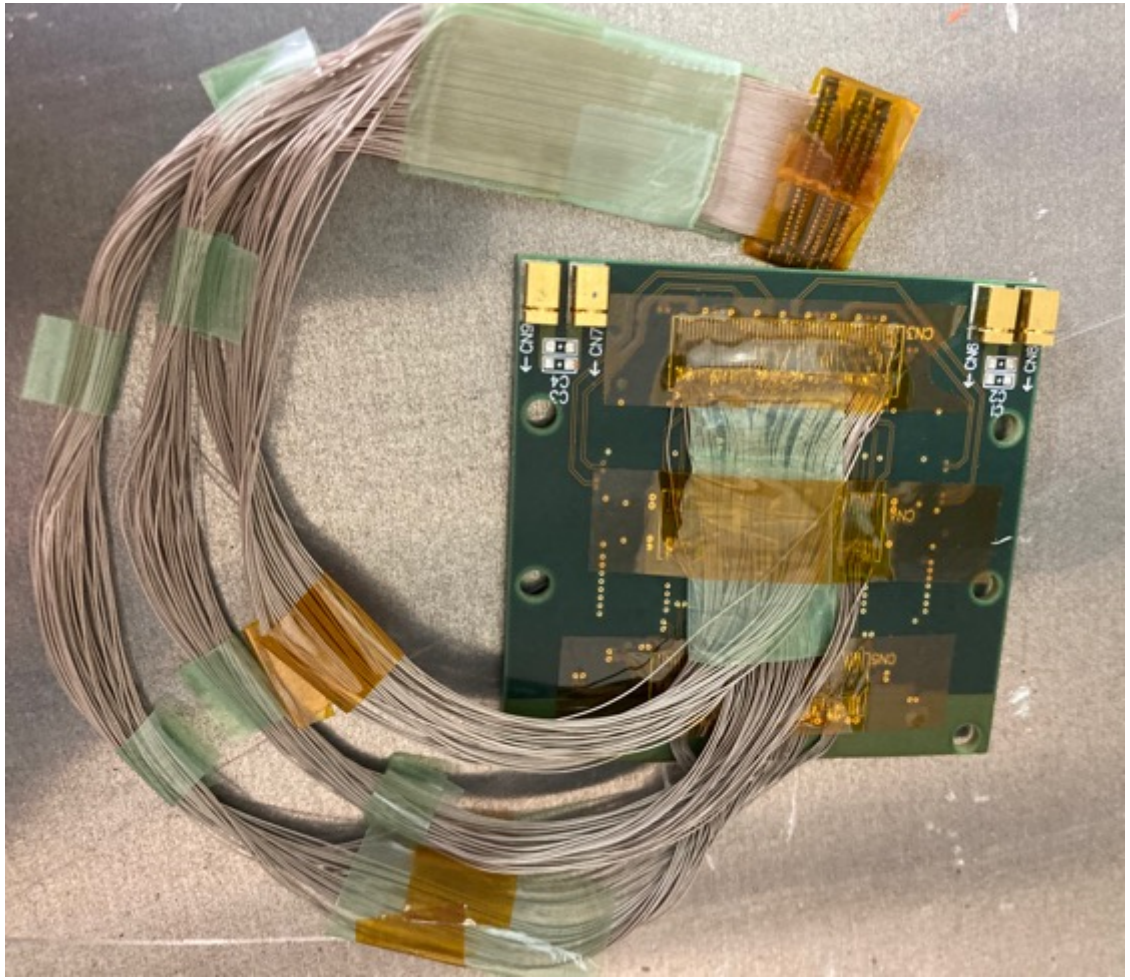


After

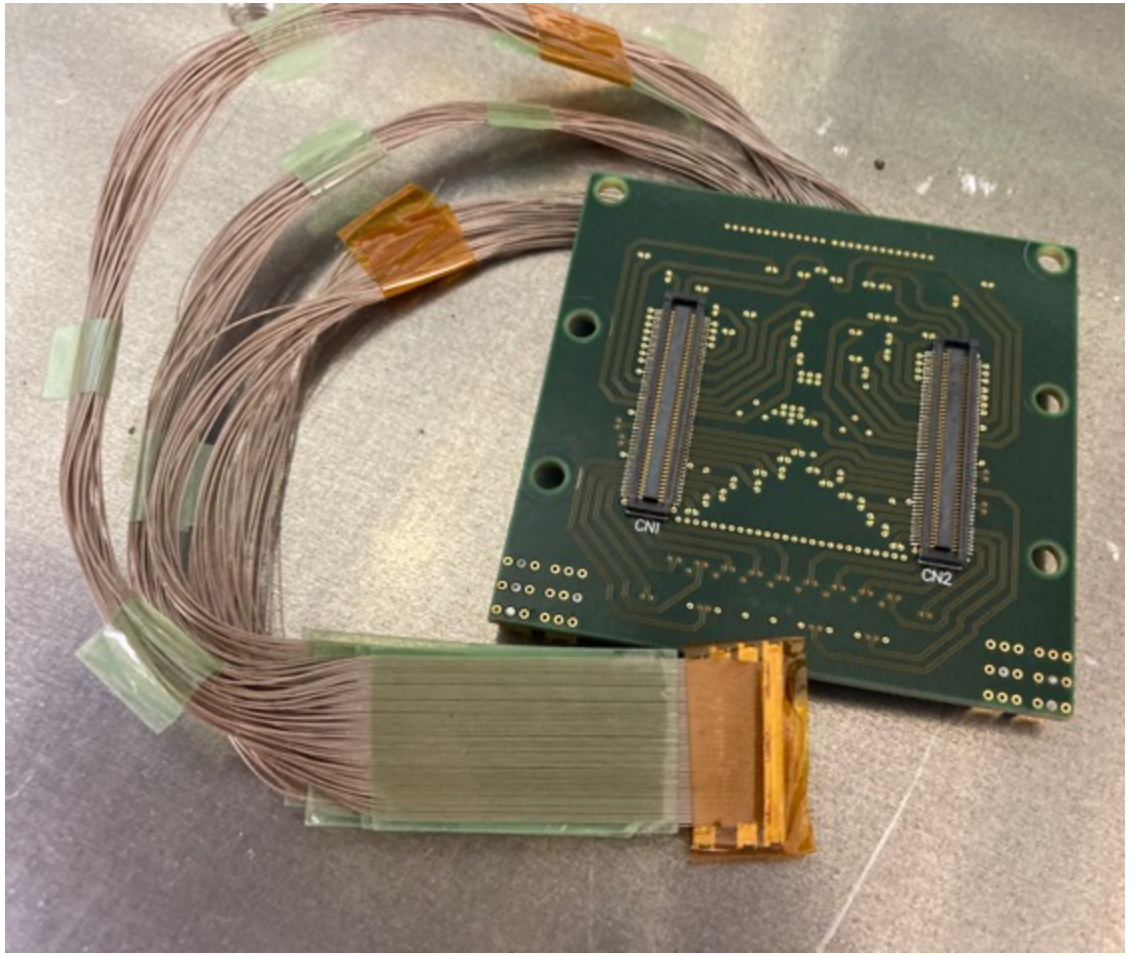
No obvious damage in PFA samples

Radiation Damage

After



After



No visible damage is observed after the irradiation.

Summary

- Prototype-I μ-coax conversion cable was irradiated for 1.7×10^{13} neutrons.
- No obvious damage has been observed after the irradiation at least visibly.
- The prototype-I cable is planned to be taken out from the radiation area and be tested again its performances.
  - sParameter and TDR in TIRI (April)
  - Stability data acquisition test with 1.1m BEX + μ-Coax at RIKEN (March ~ April)