Weekly_MT_20250501

- Gas study with test chamber : Status update
- Status of E80-CDC
- ToDo list
- Schedule

Yuto Kimura (RARiS, D1)

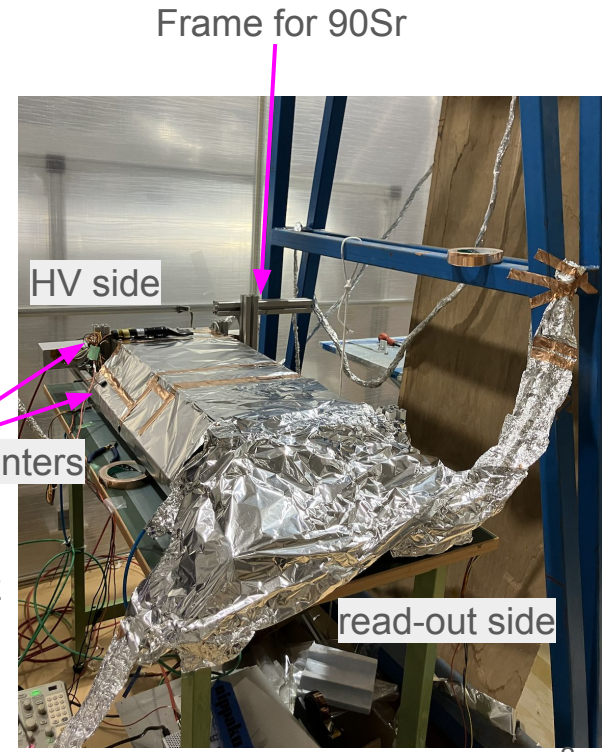
Gas study w/ test chamber : status update

Data taking with **Ar-C2H6(50:50)** was completed last week.

Data Summary :

- Wave form before and after ASD(55Fe, 90Sr) : 2024.12 and 2025.4
- QDC data (90Sr) : 2024.12
- TDC data (90Sr) : 2024.12 and 2025.4
- TDC data (Cosmic) : 2025.4

- Condition when taking TDC data
  - ASD Vth = -1.5 V
  - Trig counter (up, thickness=~0.5mm)
    - PMT(KA88??) HV = 1600V
    - NIM Discri Vth = - 25mV
  - Trig counter (down, thickness=~5mm)
    - PMT(KA88??) HV = 1300V
    - NIM Discri Vth = - 25mV
  - Trig Rate (Coincidence rate of the two trig counters) = ~300Hz
  - Gas Flow
    - 2024.12 : maybe 30~50ml/min
    - 2025.4 : 10~25ml/min

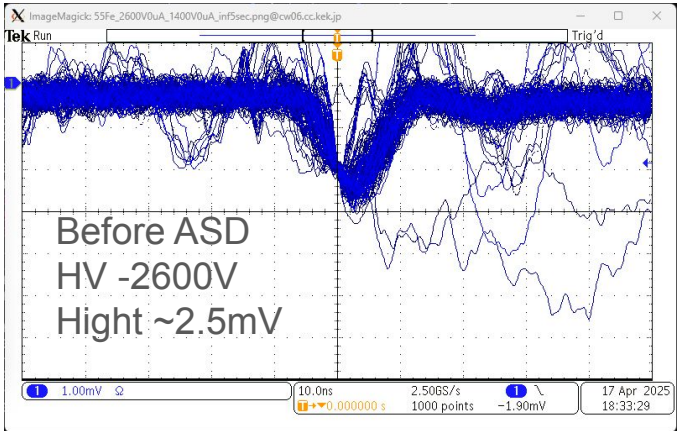


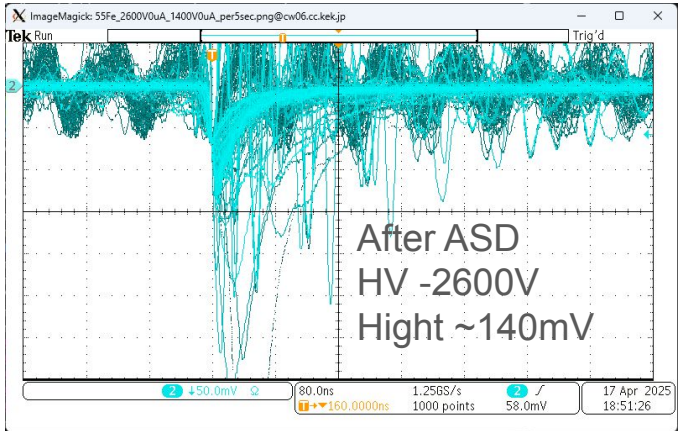
Gas study w/ test chamber : status update

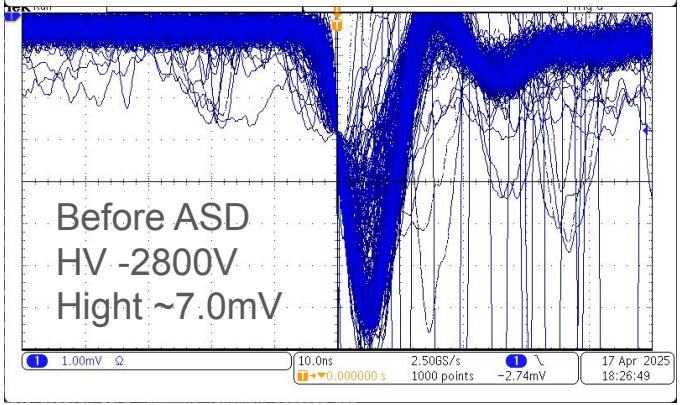
Data taking with Ar-C2H6(50:50) was completed last week.

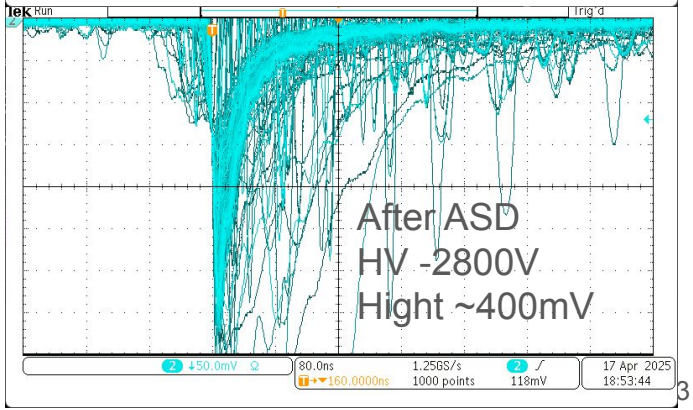
Examples of
55Fe X-ray analog signals

The difference of wave forms between 2024 and 2025 was not seen.
(ref. DOLAMI CDC
Log Book vol.2)







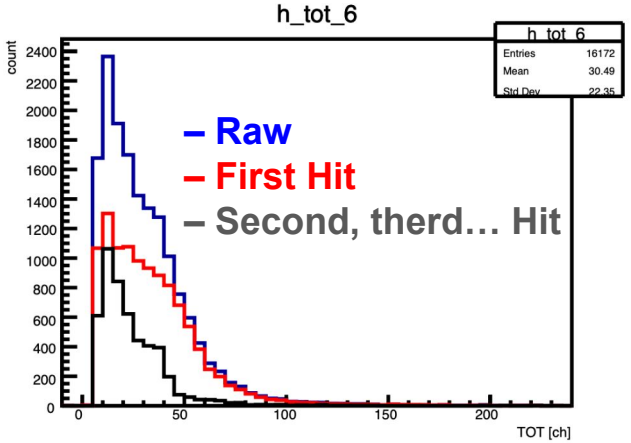


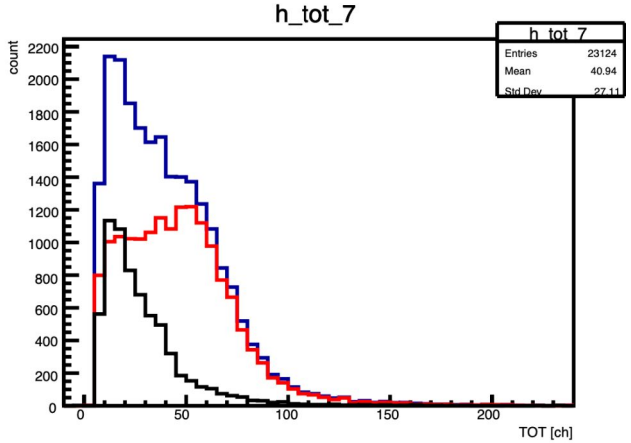
Gas study w/ test chamber : status update

Difference of TOT spectra between 90Sr and Cosmic was not seen with Ar-C2H6.

TOT, 90Sr, run137
HV = -2600V
20 k events

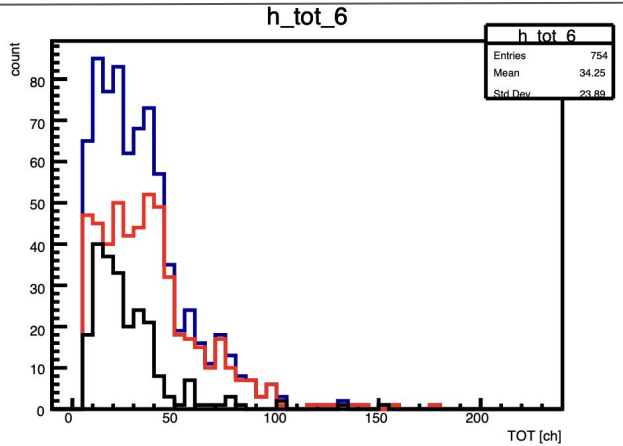
wire#6, 7

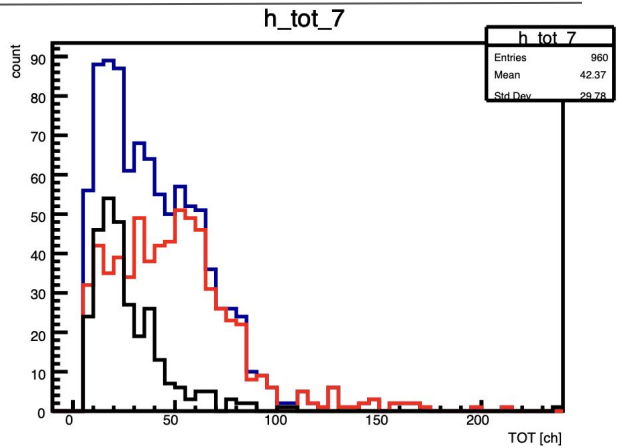




TOT, Cosmic, run134
HV = -2600V
~1500 events

wire#6, 7



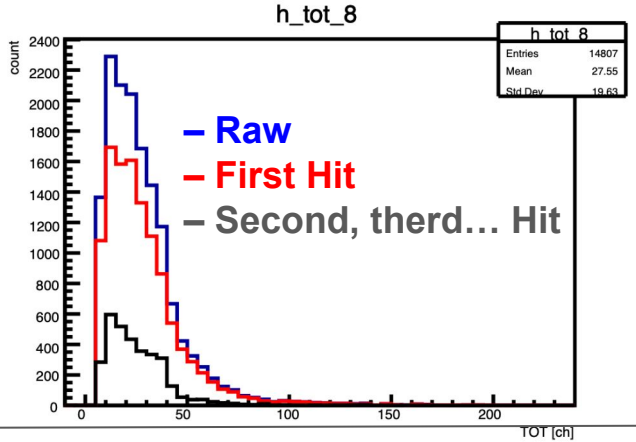


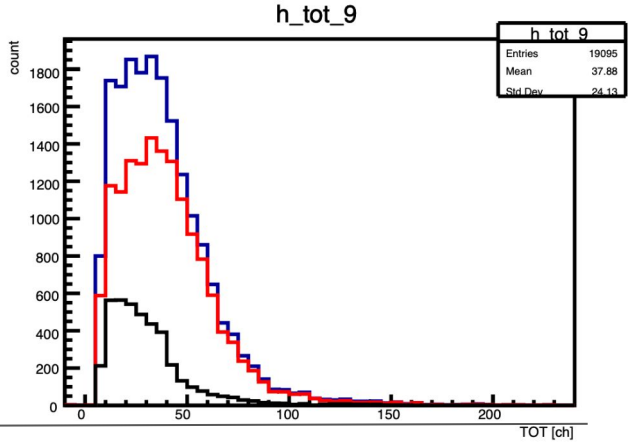
Gas study w/ test chamber : status update

Difference of TOT spectra between 90Sr and Cosmic was not seen with Ar-C2H6.

TOT, 90Sr, run137
HV = -2600V
20 k events

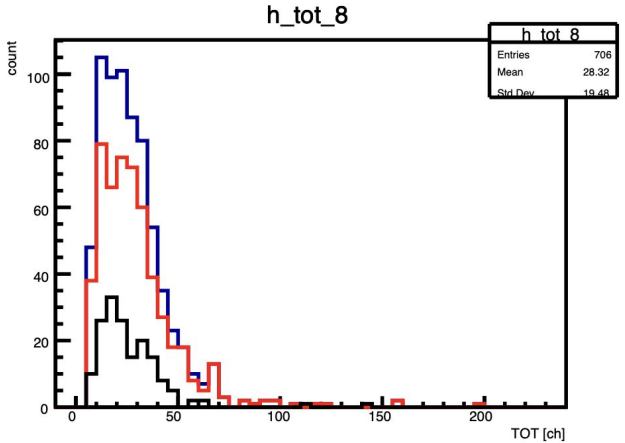
wire#8, 9

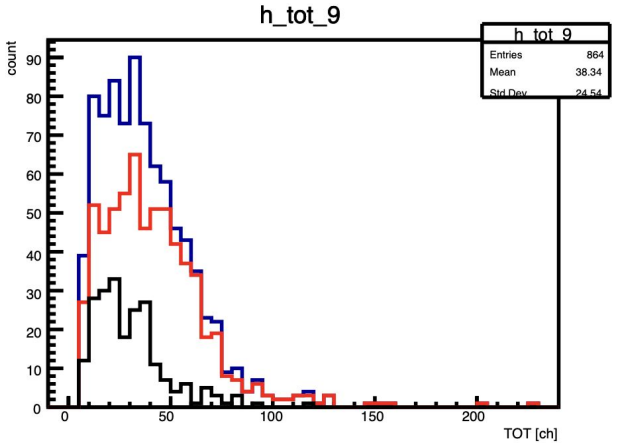




TOT, Cosmic, run134
HV = -2600V
~1500 events

wire#8, 9



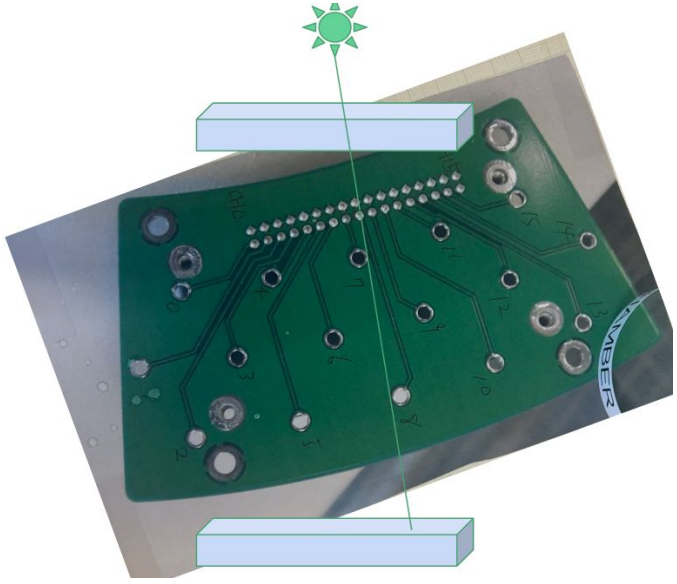


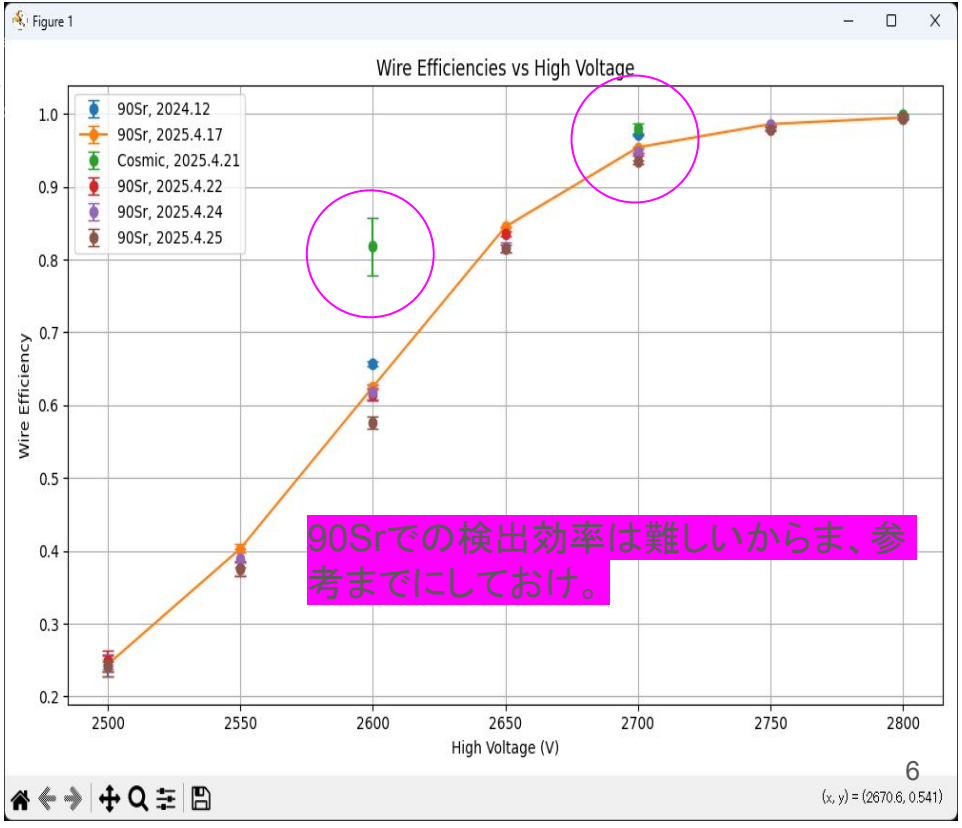
Gas study w/ test chamber : status update

Difference of TOT spectra between 90Sr and Cosmic was not seen with Ar-C2H6,
but their efficiencies were somehow slipped…

$$\mathrm{WEff} = \frac{(\mathrm{hit6\ or\ hit9})\ \mathrm{and}\ (\mathrm{hit}(7,8)\ \mathrm{and}\ !\mathrm{hit}(4,5,10,11))}{\mathrm{hit}(7,8)\ \mathrm{and}\ !\mathrm{hit}(4,5,10,11)}$$

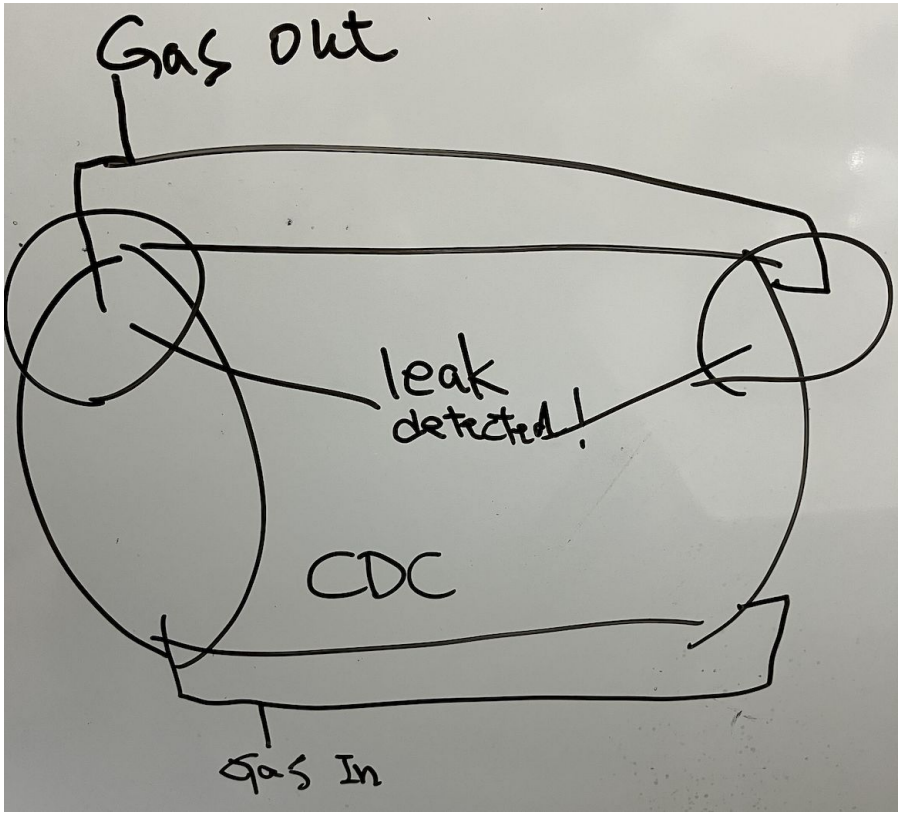
(only using the hits with TOT greater than 30 [ch])





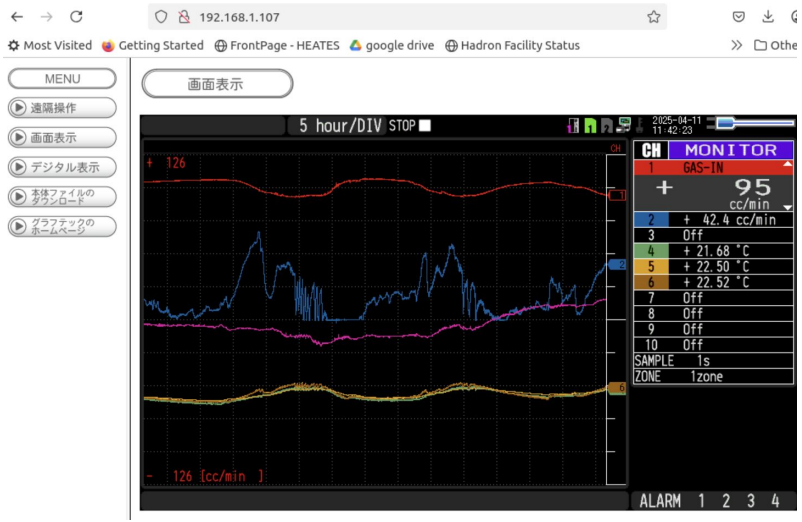
Status of E80-CDC

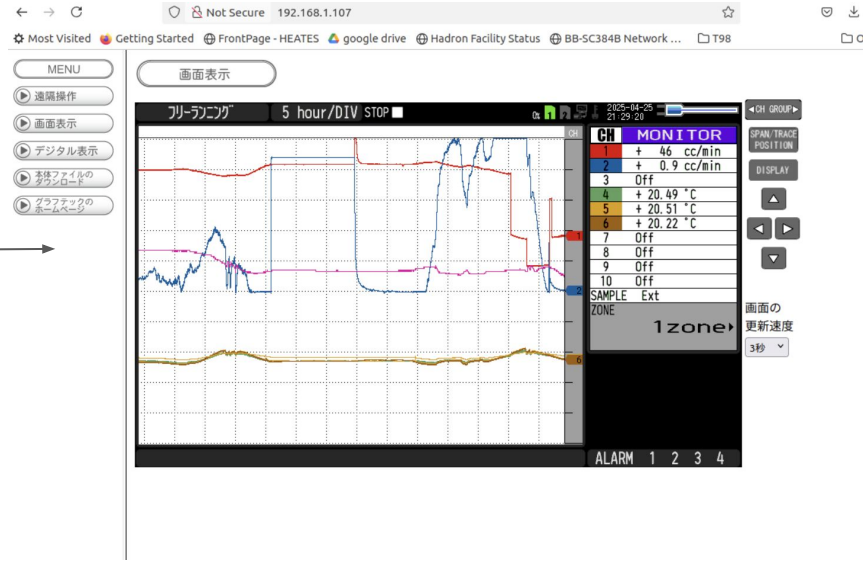
Gas leak detected! → changed the gas tube connector



Status of E80-CDC

Gas leak detected! → changed the gas tube connector
→ **conservation of Gas in-out!!**





And still under aging by -1500V…

ToDo list

- J-PARC Sympo proceedings : resubmission within next 3 weeks

Referee's Report	
	This paper reports on a study of the chamber gas for the Cylindrical Detector System (CDS), a key detector to be used in the J-PARC E80 experiment scheduled to begin in 2027, which aims to search for the KNNN bound state. In the previous experiment, E15, Ar-C_2H_6 (50:50) gas was used. However, since this is a flammable gas and the size of the CDC will be three times larger in E80, a non-flammable gas was sought as an alternative. Using the gas simulation tool Garfield++, the drift velocity and gain were evaluated, and Ar-CO_2 (90:10) was determined to be the optimal choice. Cosmic-ray tests and data analysis confirmed that sufficient resolution and detection efficiency could be achieved with this gas mixture. This paper clearly and systematically describes the gas study in detail and can be considered to have reached a publishable level. Minor comments: There is an inconsistency between the dimensions shown in Figure 2 and those described in the text. The figure lists an inner diameter of 330 mm, while the text mentions an inner radius of 150 mm. Also, the figure shows a length of 2680 mm, whereas the text states 2580 mm. Even if they are referring to different lengths, it would be clearer to standardize or clarify this discrepancy. It is stated that the results in Figure 5 agree well with the Garfield++ simulations, but it would be helpful to include a quantitative comparison—either in the figure or in the text—showing how closely the two results match. In the upper part of Figure 6, "Cosimc-ray" should be corrected to "Cosmic-ray." Regarding the references: if there is a publication detailing the CDC used in the E15 experiment, which was also used in the cosmic-ray test, it should be cited. Additionally, it would be helpful to include at least a web link or pointer to the Garfield++ resource. There are no major issues with the English, but if necessary, the manuscript could be submitted for professional proofreading.

- RARiS annual report : submit OK?-->OK, すぐにでも提出します。
- DC2 : 今日明日である程度初版を完成させる → 大西さんに見てもらいたい (学内事務締切 - 5/13)

Schedule

- ~2025.05.06 : Sendai
- 2025.05.07 ~ 2025.5.11 : Tokai
- 2025.5.12 ~ : RIKEN

What we need for test chamber @RIKEN

- ASAGI, 変換基板,ASAGA sys用cable? → 白鳥さん??
- HUL & DTL
- SONY ASD, 変換基板
- (Repeater : ×1) アナログ信号見るだけなら要らない。
- Power Supply
  - for repeater (SONY ASD用)
    - 5.29V : ×1
    - 5.49V, 1.02A : ×1
  - for ASAGI
    - +5.0V, 0.5A : ×1
  - for SONY ASD
    - +3.0V, 0.38A : ×1
    - -3.0V, 0.13A : ×1
    - Vth 1~10V, 0~0. A : ×1
- Gas system
  - Ar-C2H6 : ×1
  - レギュレータ(可燃) : ×1
  - Flow meter (needle式) : ×1
  - 1/4ガスチューブ
  - バブラー : ×1
- Cable
  - SONY ASD用
    - 6m flat cable : ×1
    - 16ch×2 <-> 32ch flat cable : ×1

今エリアにあるE15-CDCに使ってたLV(漬物石)とかの整理をしましょう。