

# Weekly\_MT\_20250521

- Gas study w/ test chamber : summarizing now
- Test chamber 2 : Arrived at RIKEN, Design of the frame.
- E80-CDC : No progress
- ToDo list
- Schedule

# Gas study

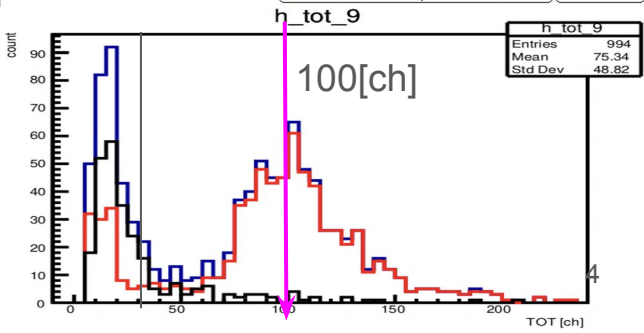
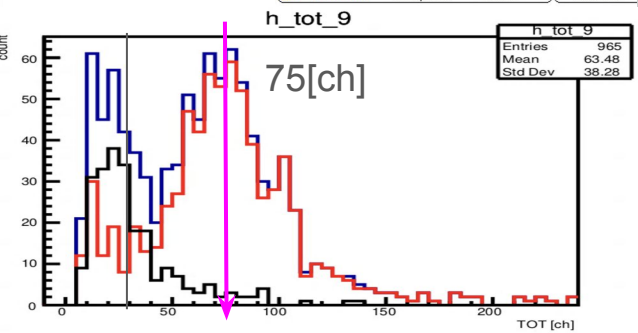
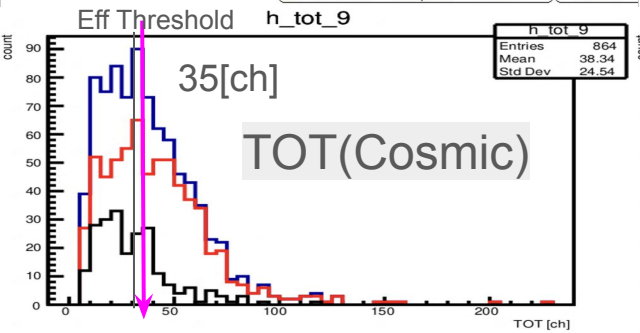
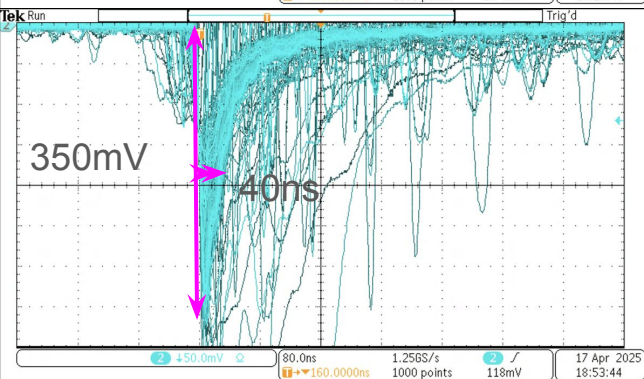
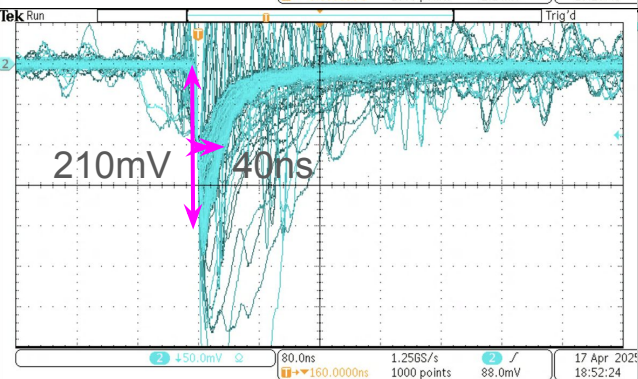
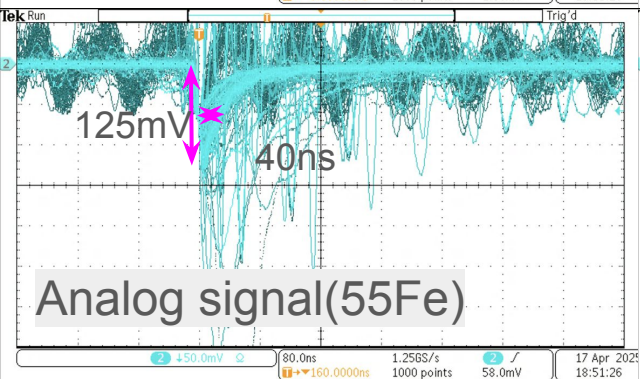
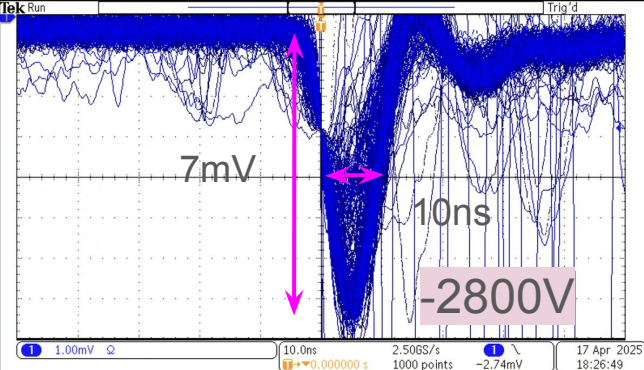
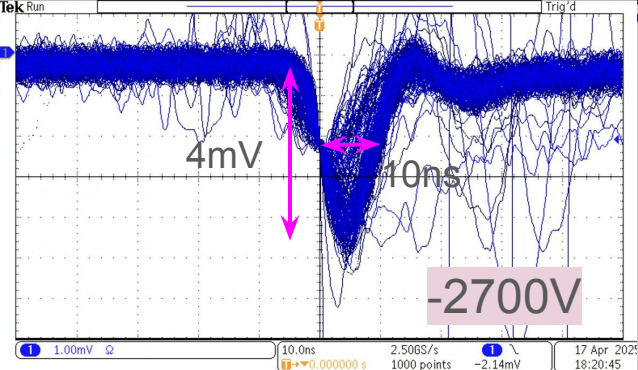
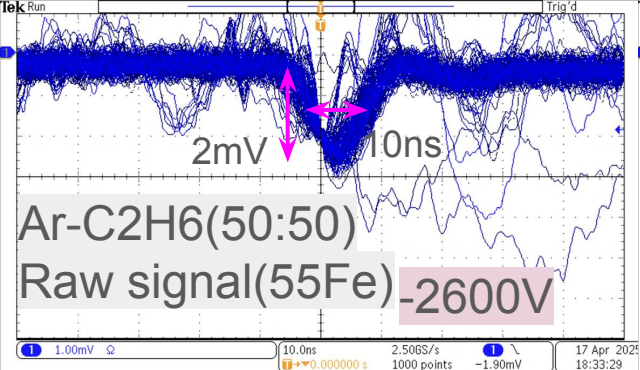
All necessary cosmic-ray data taking will be completed by tomorrow morning.

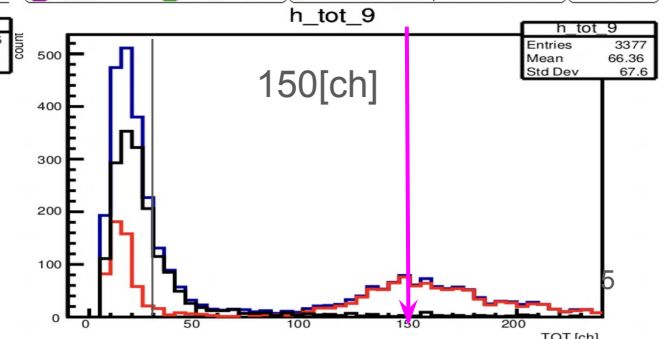
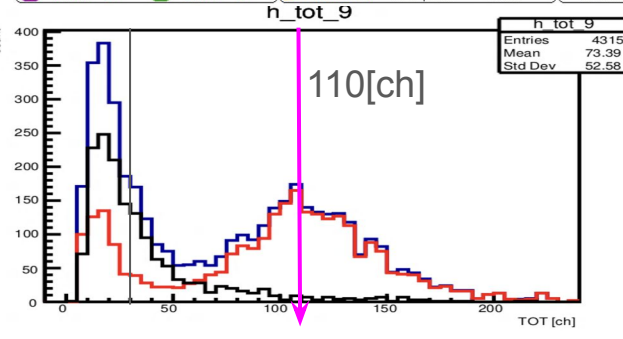
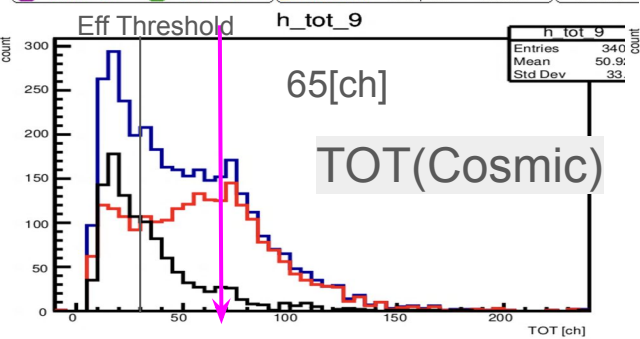
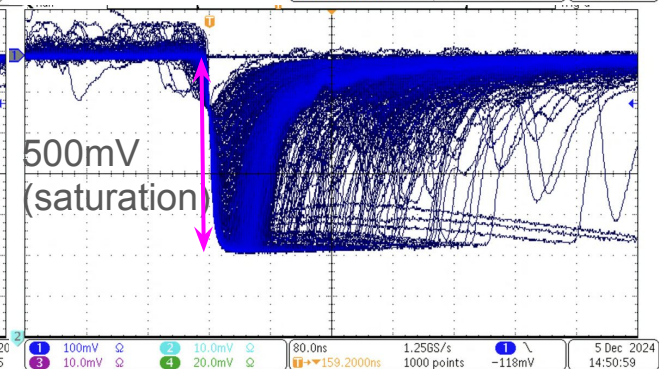
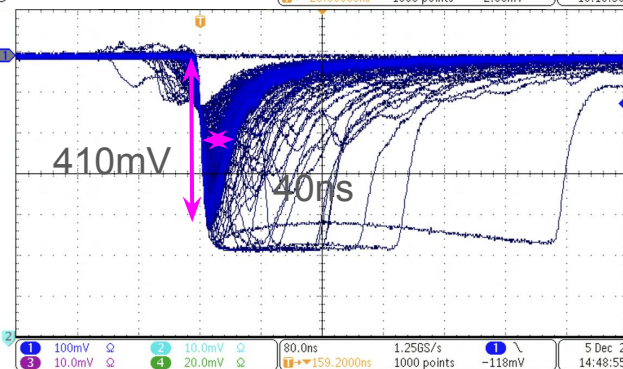
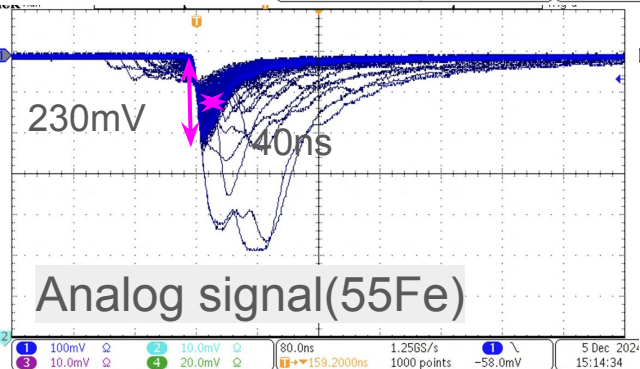
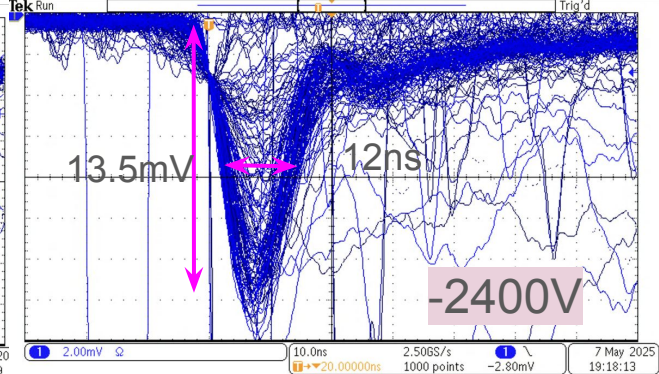
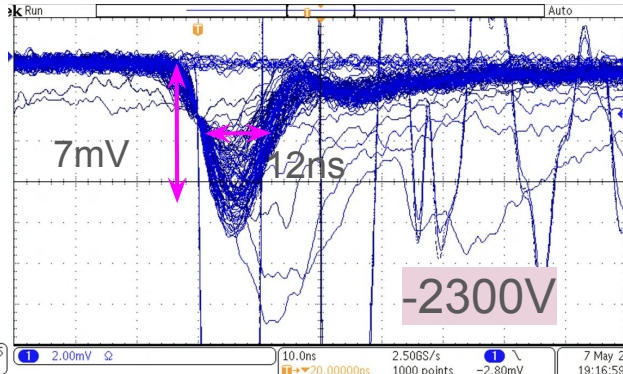
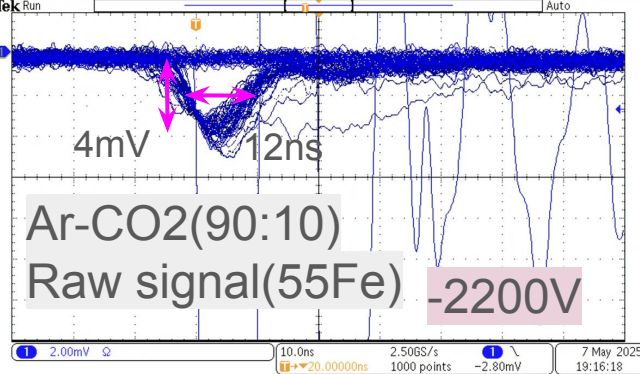
The goal of this measurement is  
to clarify **the reason for the lower efficiency  
observed with Ar-CO<sub>2</sub>(90:10) compared to Ar-C<sub>2</sub>H<sub>6</sub>(50:50),  
using only the test chamber.**

The recent tasks I've done are as follows;

1. **Rechecking the raw and analog-output signals**
2. **Performing a HV scan of the cosmic-ray TDC data**
3. **Checking the reproducibility by wire efficiency**  
(with Ar-CO<sub>2</sub>(50:50) and Ar-C<sub>2</sub>H<sub>6</sub>(50:50))

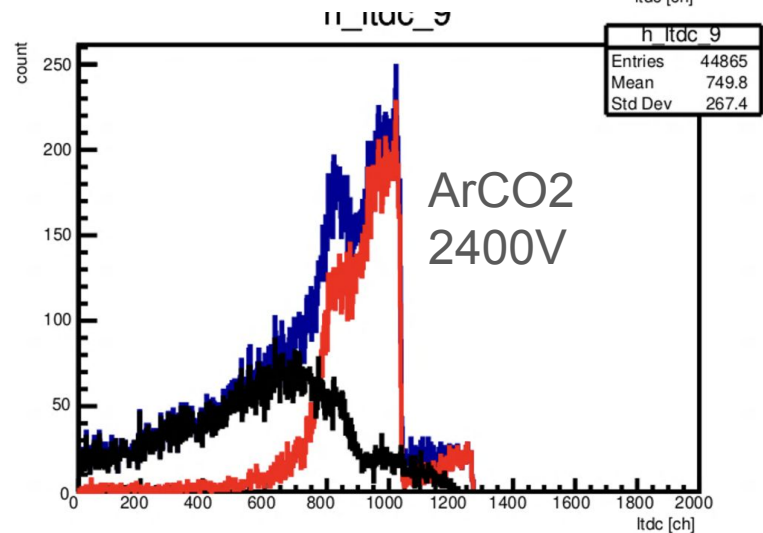
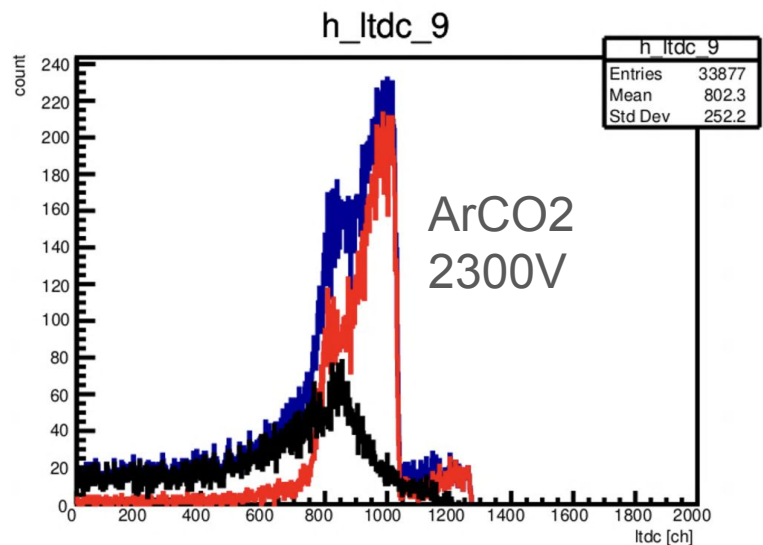
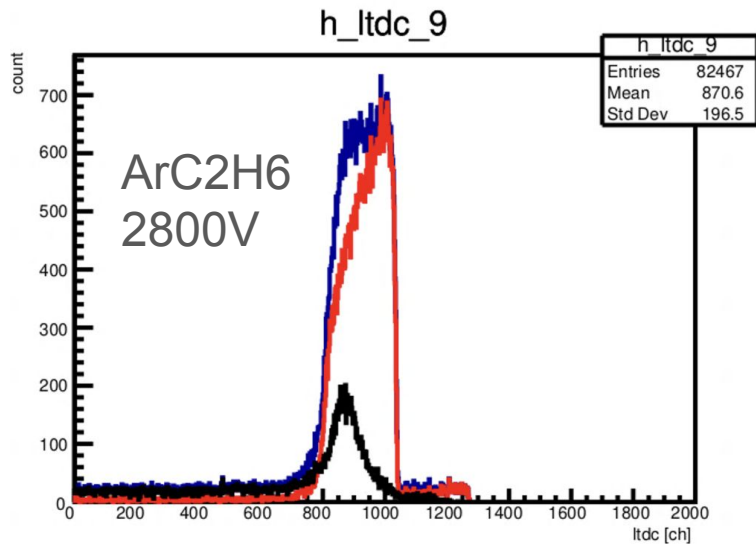
Let's set aside the result of E15-CDC for now.



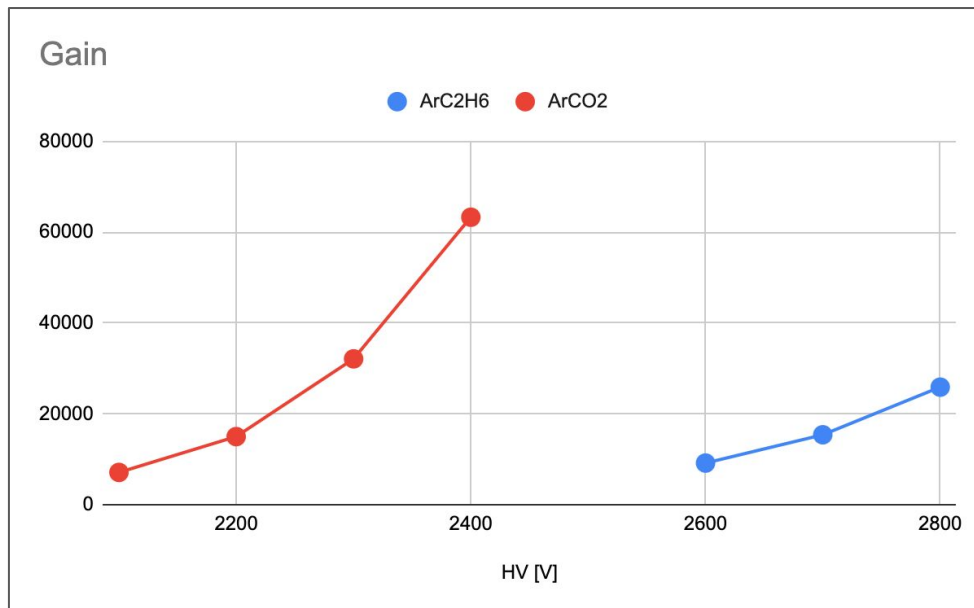




# Typical Leading TDC (90Sr) (cosmicは統計少ないので)

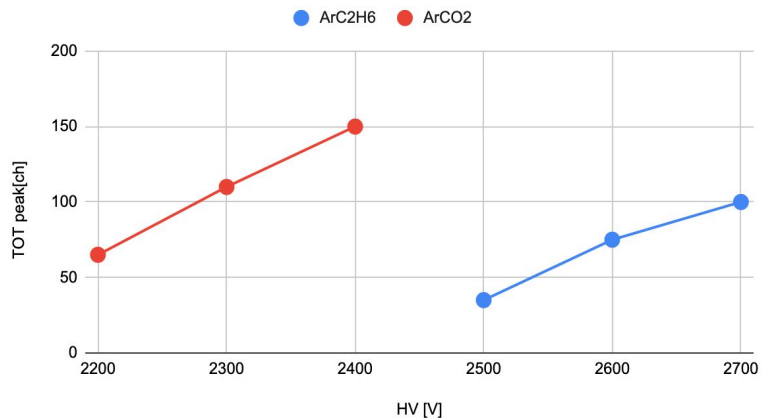


## Measured gain(2024.12) vs HV

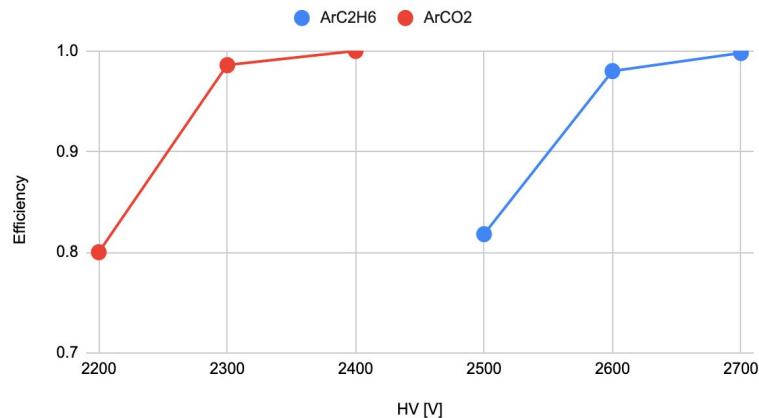


# Correlation Plots between HV - Gain - TOT peak - Wire Efficiency

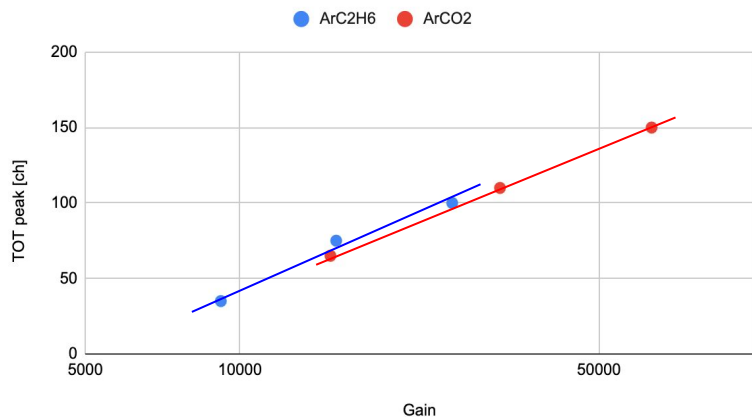
## TOT vs HV



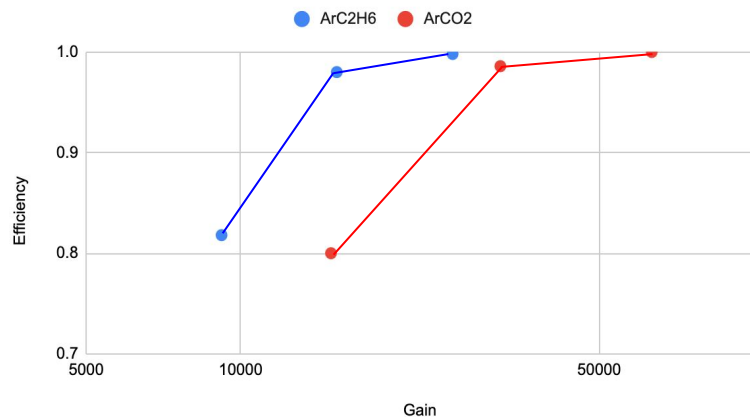
## Efficiency(Cosmic) vs HV



## TOT vs Gain



## Efficiency (Cosmic) vs Gain

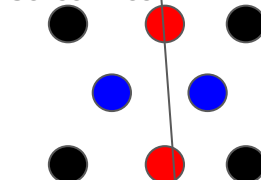


## Way to calculate the wire Efficiency

90Sr or Cosmic

Trig\_u

Sense wires



Trig\_d

Required:  
Trig\_u and \_d,  
Red wires (and)

Not required:  
Black wires (and)

Judged:  
Blue wires (or)

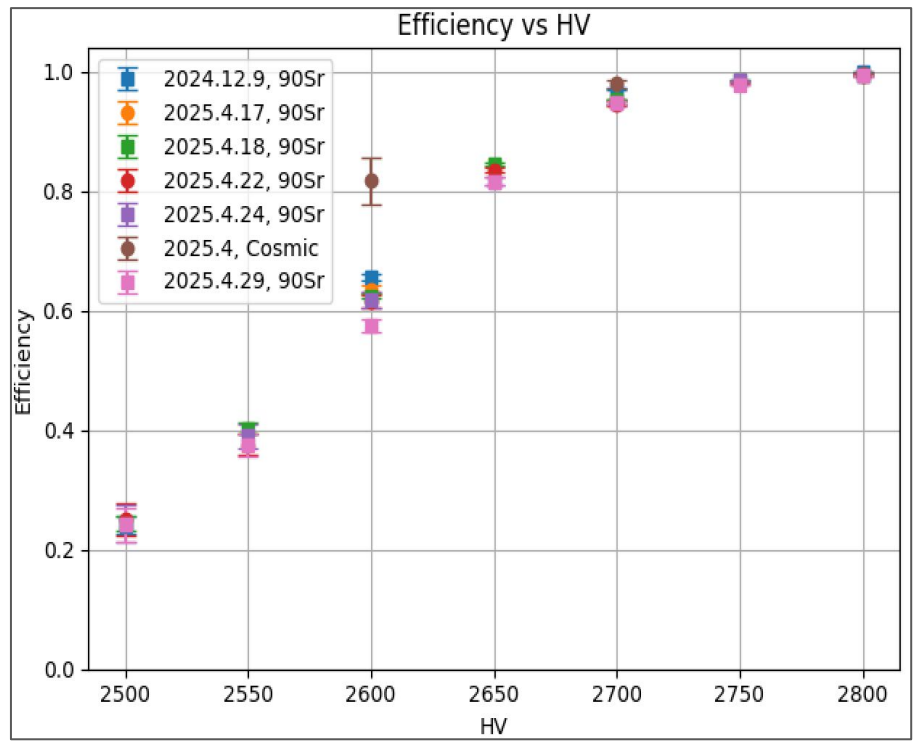


# Checking reproducibility using wire efficiency with 90Sr

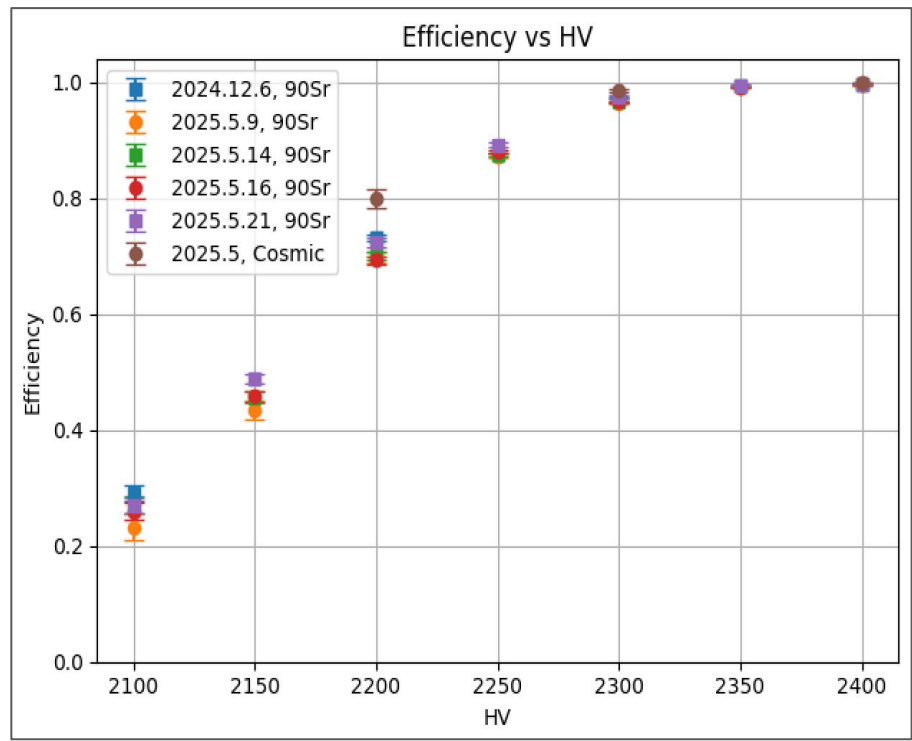
→ Looks good. Gas and the other conditions were not changed drastically.

\*\*\*Data taking timing is when HV is changed.

Ar-C2H6(50:50)



Ar-CO2(90:10)



## Conclusion about “Ar-C<sub>2</sub>H<sub>6</sub>(50:50) vs Ar-CO<sub>2</sub>(90:10)”

- About the wave form with Ar-CO<sub>2</sub>,
  - **widths of the raw signals are a little wider than Ar-C<sub>2</sub>H<sub>6</sub>.**
  - **the rising edges of the analog outputs are slower than Ar-C<sub>2</sub>H<sub>6</sub>.**
- **The correlation between gain and TOT peak appears consistent between the two gases — that is, the TOT peak occurs at the same position when the gain is the same.**
- **In the TOT spectra, the peak for Ar-CO<sub>2</sub> is broader than Ar-C<sub>2</sub>H<sub>6</sub>. Therefore, the number of hits below the TOT threshold increase, in the case of Ar-CO<sub>2</sub>.  
That’s why we can’t achieve sufficient efficiency with Ar-CO<sub>2</sub>, compared to Ar-C<sub>2</sub>H<sub>6</sub>.**
- **As a result, we need bigger HV with Ar-CO<sub>2</sub>, and there is a lot of noise.**

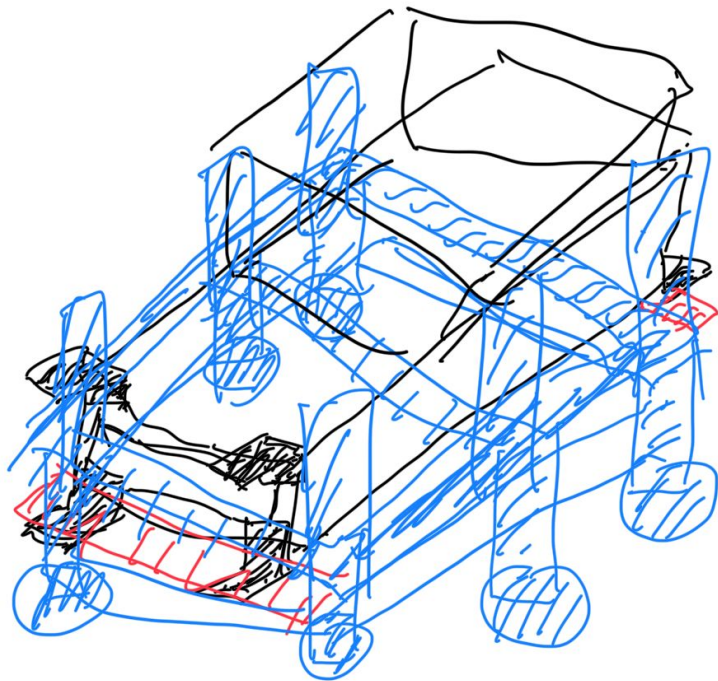
# Test chamber 2

## Test chamber 2

- Yesterday, it came to RIKEN.
- Wire connection → No problem
- There are some bolts or nuts inside the chamber...  
But anyway there is no effect to electric field.
- We roughly sat up the gas supply line.
  - one flow meter (needle type)
  - two mass flow meter and a logger (not setted up yet)
  - Gas is not flowing yet.
- Plan:
  - I'm designing the frame for it and old test chamber, considering various practical aspects.



何も考えず二段(高さ0.7m)で良いかも。  
下にchamber2、上にold chamber。  
old chamberは簡単に移動できるようにしたい。



# ToDo

- DC2 : Done

# My Schedule

- Now : Tokai
- 2025/5/23 : move to Saitama
- ~ : RIKEN



Back up

# What we need for test chamber @RIKEN

- ASAGI, 変換基板, ASAGA sys用 cable? → 白鳥さん??
- HUL & DTL
- test chamber1 → RIKEN
- SONY ASD, 変換基板 2セット分 → ASD(テスト用のやつ)磯部さんにいくつか貸す
- Repeater : ×1 (Repeaterのクレート? はBPCに使ってたやつ)
- Power Supply
  - CAENクレート (Pot Wire用) (今準備棟にあるやつ)
  - 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, 油 : ×1 (油はJ-PARCから持っていく)
- Cable
  - SONY ASD用
    - 6m flat cable : ×2
    - 16ch×2 <-> 32ch flat cable : ×2
    - Lemo類
    - SHVとか
    - Trig counter ×2
- NIMビン、モジュール一式
  - 赤HV, clock, discri, divider, coin, fan-in-fan-out, gate-generator, scaler, ECL->NIM (NIM->ECLも欲しい...) etc...

青はもう理研にあるもの