

Status report for range stack holder and Helium bag for D5

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☆ The arrangement plan of the range stack holder

Fig.1

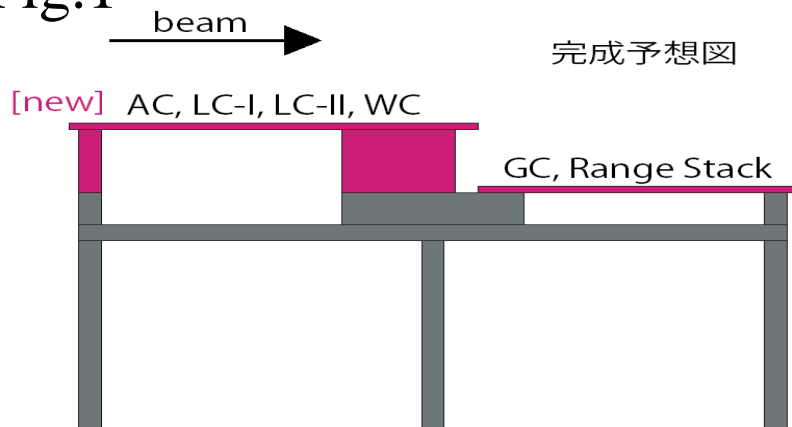
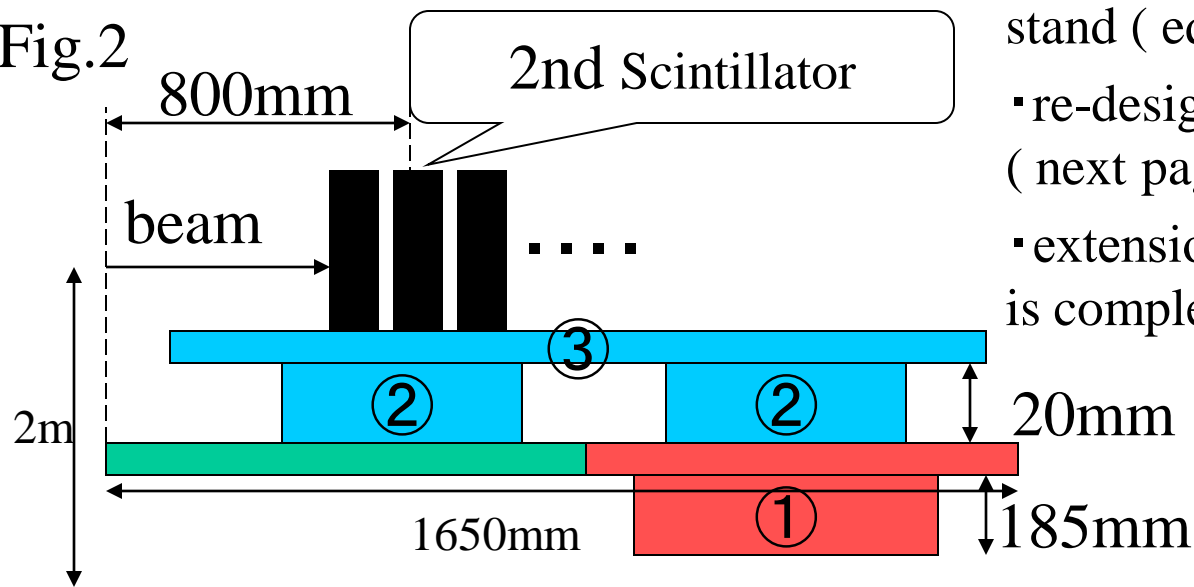


Fig.2



- the beam height is 2m
- up the GC, Range Stack stand to 185mm(using Fujioka's spacer, ①)
- make stands to up the range stack to 20mm(②)
- make a stand to set up the range stack holder (③)
- adjust 2nd Scintillator to center of this stand (equal to CDC center)
- re-designed the range stack holder (next page)
- extension of the range counter's booster is completed

☆ Stands design in Fig .2

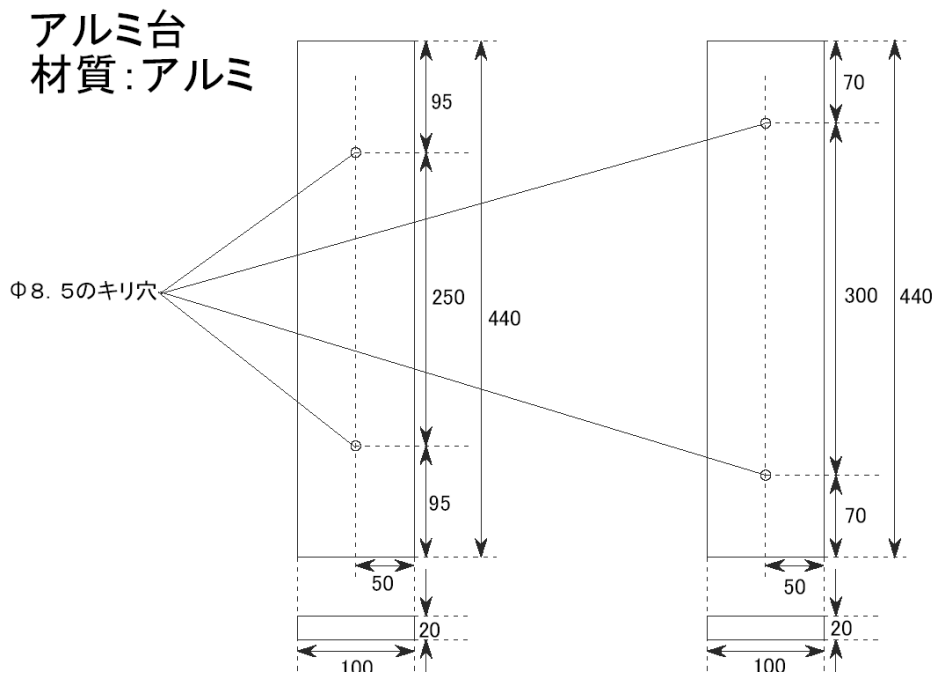


Fig.3-1 ②'s design

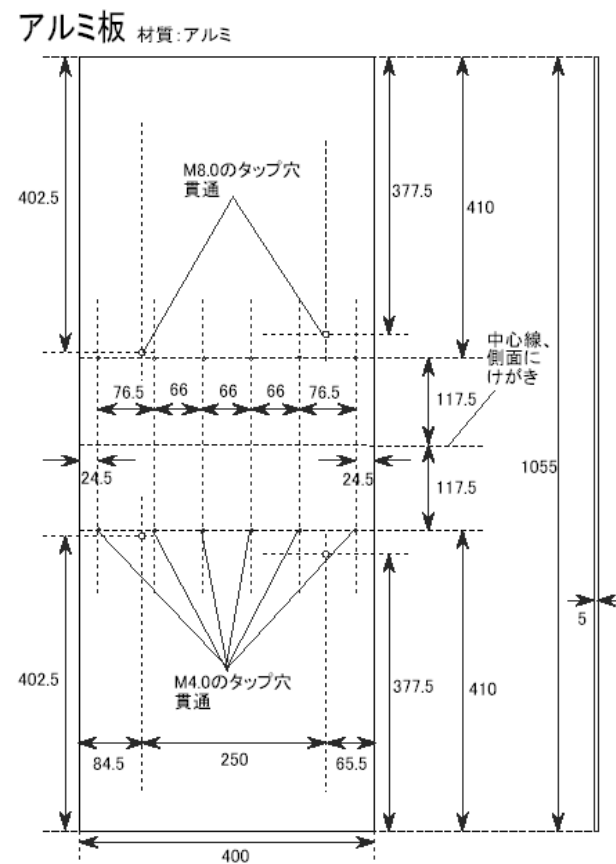


Fig.3-2 ③'s design

☆size of the range counter and re-design of the range stack holder

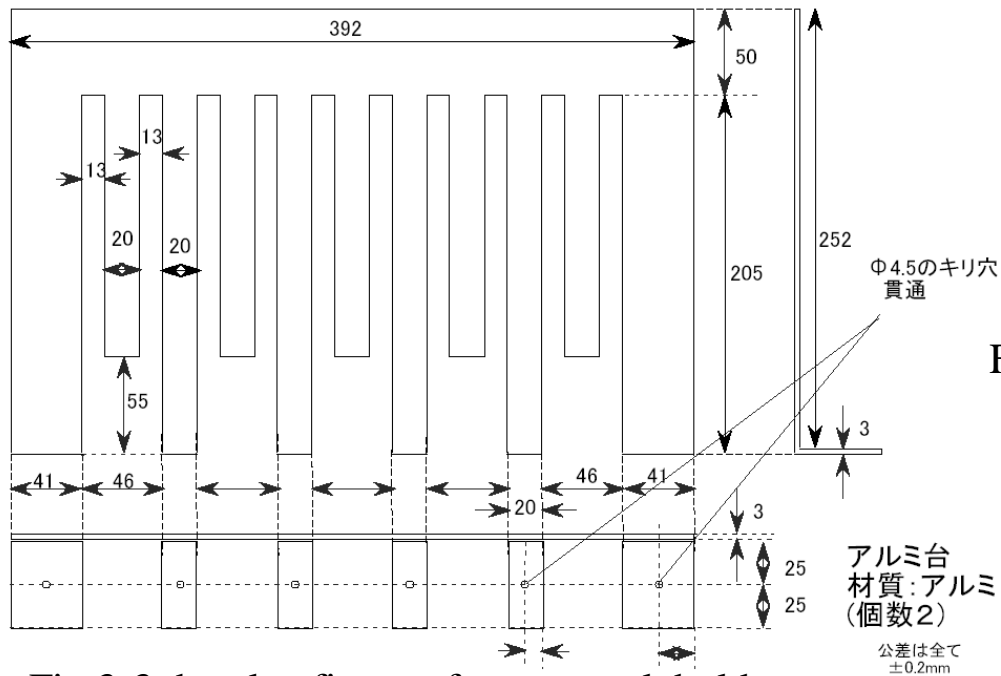


Fig.3-3 the plan figure of range stack holder

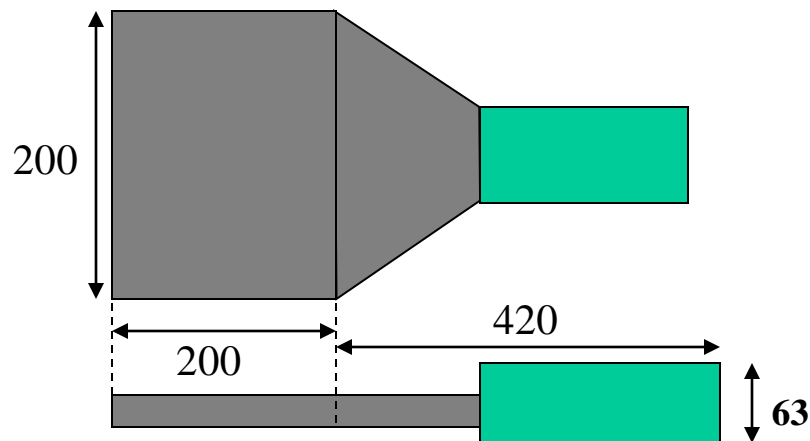


Fig.5 the size of scintillator and right guide and photomultiplier

- the range counter is consisted by 10 Scintillators with photomultiplier
- The distance between two stack holders is 185mm (Fig.4).Kaon beam will come center of scintillster.
- The range counter, the part of photomultiplier's bottom diameter is about 63mm (because of magnetic shields).So improvement is taken in the range stack holder. (the slid distance 60mm→66mm)

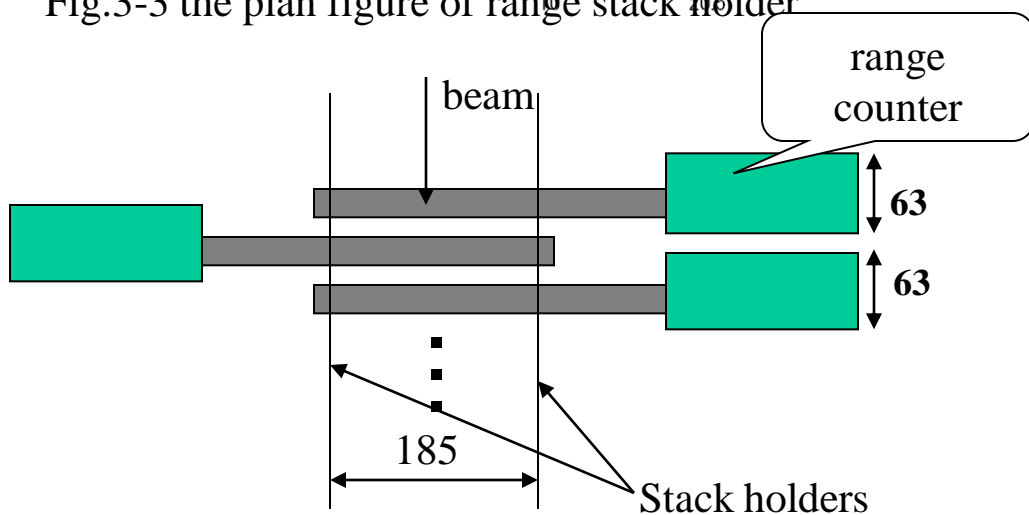


Fig.4 the arrangement of range counter

☆ Helium bag design and arrangement

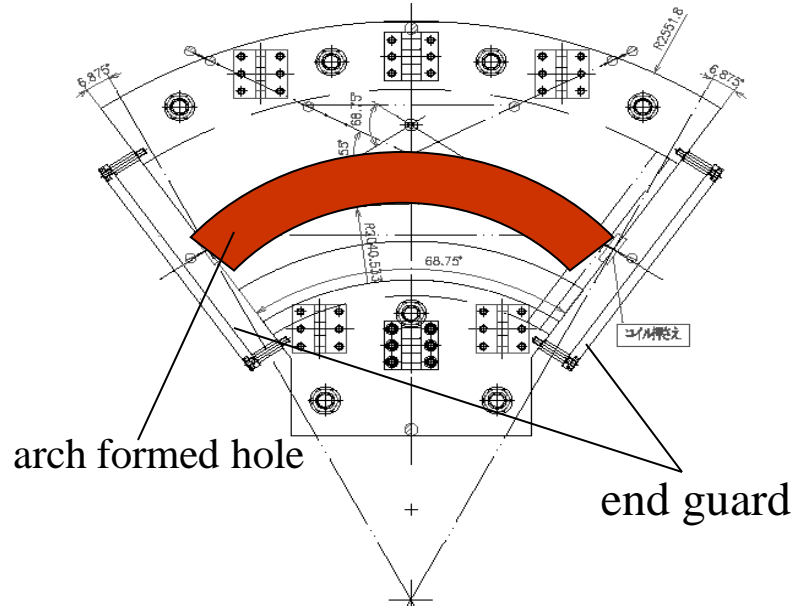


Fig.6 the design of D5 magnet

ヘリウムバッグ図面

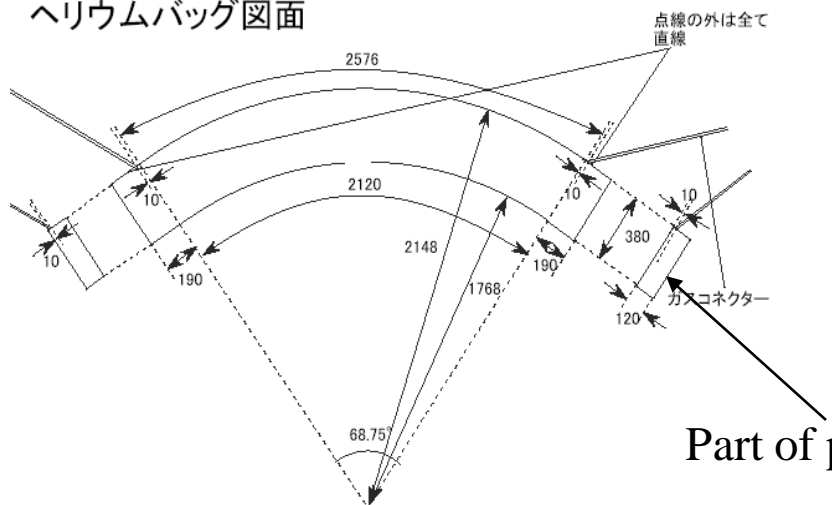
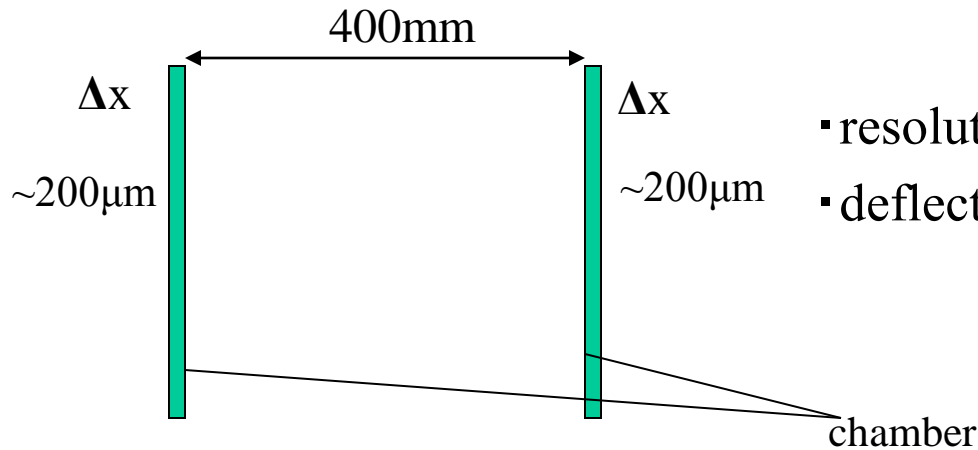


Fig.7 the design of Helium bag

- Helium bag is designed for reducing multiple scattering in D5 magnet.
- D5 magnet have arch formed hole. The hole size is 380 × 120.
- Helium bag is designed through the magnet's hole.
- The bag's thickness is estimated about the part of passing particles in next page. (the other part is all 50μm)
- The bag is made using Mylar.
- gas connector is connected sinflex tube (called 64)

☆ resolution of chamber



- resolution of chamber : $\Delta\theta_{\text{chamber}} \sim 7.0 \times 10^{-4}$
- deflection angle in D5 magnet : θ_0

Fig.8 resolution of chamber

θ_0 (only air) $\sim 10^{-3}$

θ_0 (Mylar + helium) $\sim 10^{-4}$

θ_0 must be under resolution of chamber.

So we plan to put Helium bag in D5 magnet.

Available Mylar's thickness is **38 μm** or **16 μm** .

☆ estimation of Helium bag's thickness

- estimate helium bag's thickness (the part of passing particles)
- if the passing particle is kaon and the momentum is 1 GeV/c
- X/X_0 is the thickness of the scattering medium in radiation length.

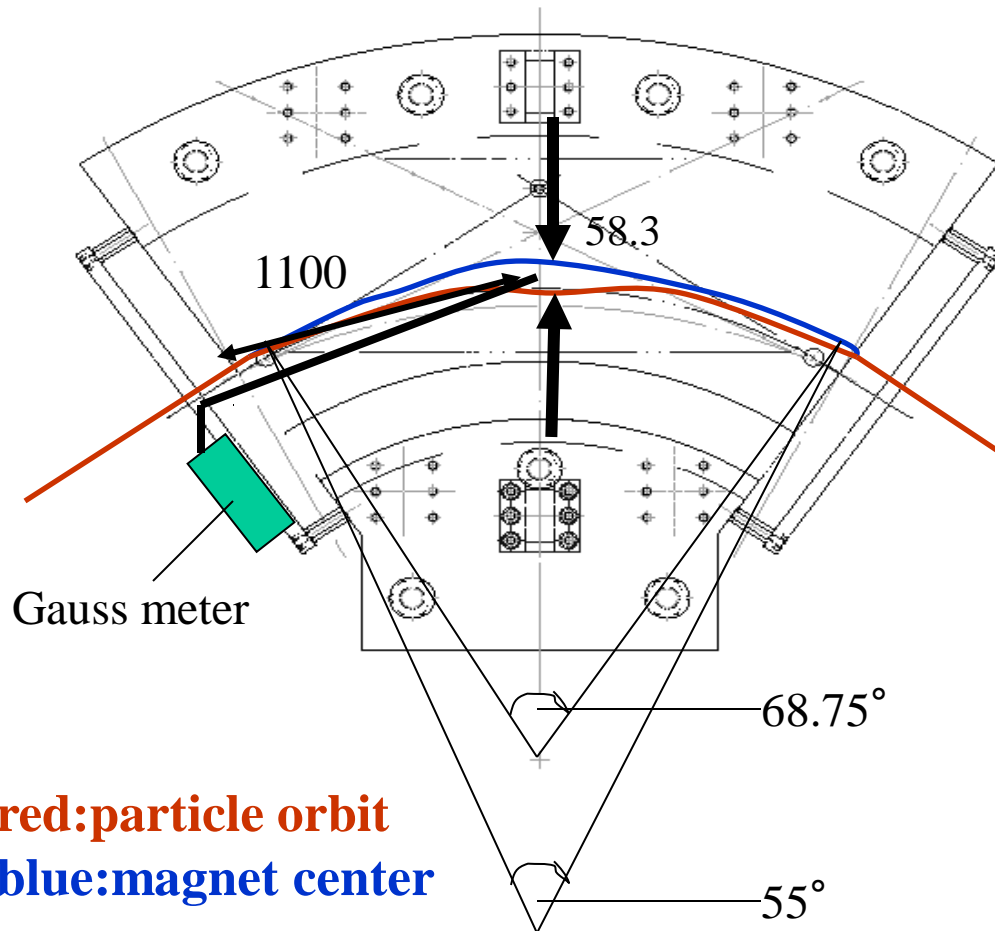
	Air (2200mm)	Mylar(16μm \times 2) +He(2200mm)	Mylar(38μm \times 2) +He(2200mm)
X /X ₀ (only Mylar)		1.12×10^{-4}	2.66×10^{-4}
X/X ₀ (only gas)	7.237×10^{-3}	0.387×10^{-3}	0.387×10^{-3}
θ_0 (deflection angle)	9.39×10^{-4}	2.16×10^{-4}	2.50×10^{-4}

cf. resolution of chamber is 7×10^{-4}

Comparing with θ_0 , Mylar's thickness is **16 μ m**'s one and **38 μ m**'s one, the difference is a little. So we chose **38 μ m**'s one because of considering bag's strength.

☆ The arrangement plan about Gauss meter

- In D5 magnet, the magnet's center and passing particle's orbit center is different. The difference of their radius is about 58.3mm and the angle is 68.75° and 55° .



red:particle orbit
blue:magnet center

Fig 9.difference of center in D5 magnet

- Gauss meter is necessary to measure magnetic field in D5 magnet. It will be arranged in Fig.9.
- The center of magnet's hole is $\sim 1100\text{mm}$, Gauss meter's connect tube is $\sim 2000\text{mm}$.
- Gauss meter's holder design is in progress.
- The holder will be made using non-magnetic material.
- I'm going to consider about this problem and make arrangement design soon.

☆ time table

- **Range stack holder → manufacturing, delivery **September 1st****
- **Helium bag → manufacturing, delivery **September 15th****
- **Helium bag and range stack holder → installed until **September 30th****
- **The hole probe's holder → design is in progress , installed until **September 30th****