

理研 加速器 吉田敦

実験参加者

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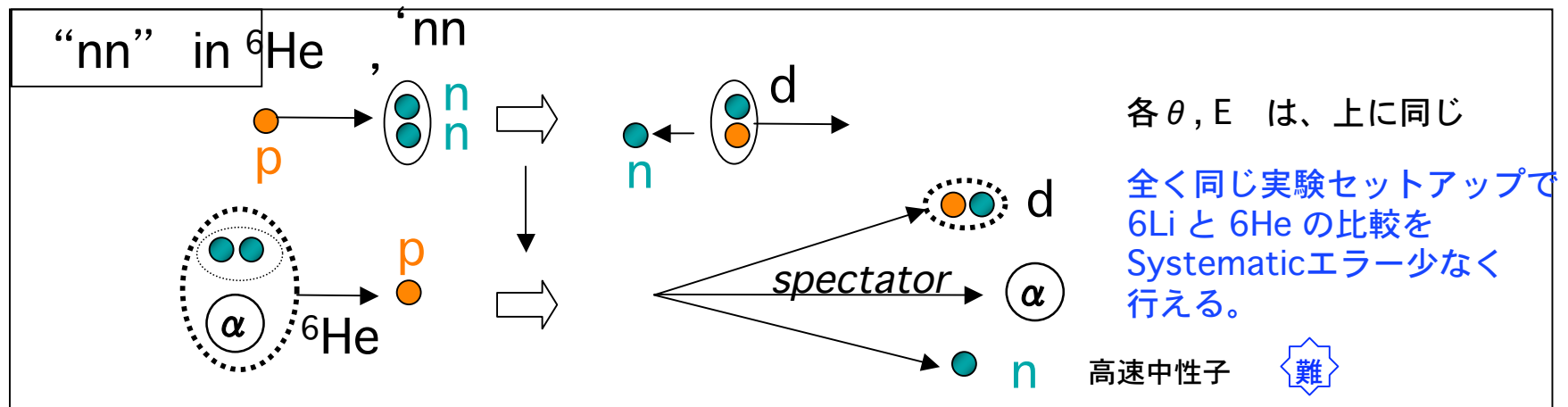
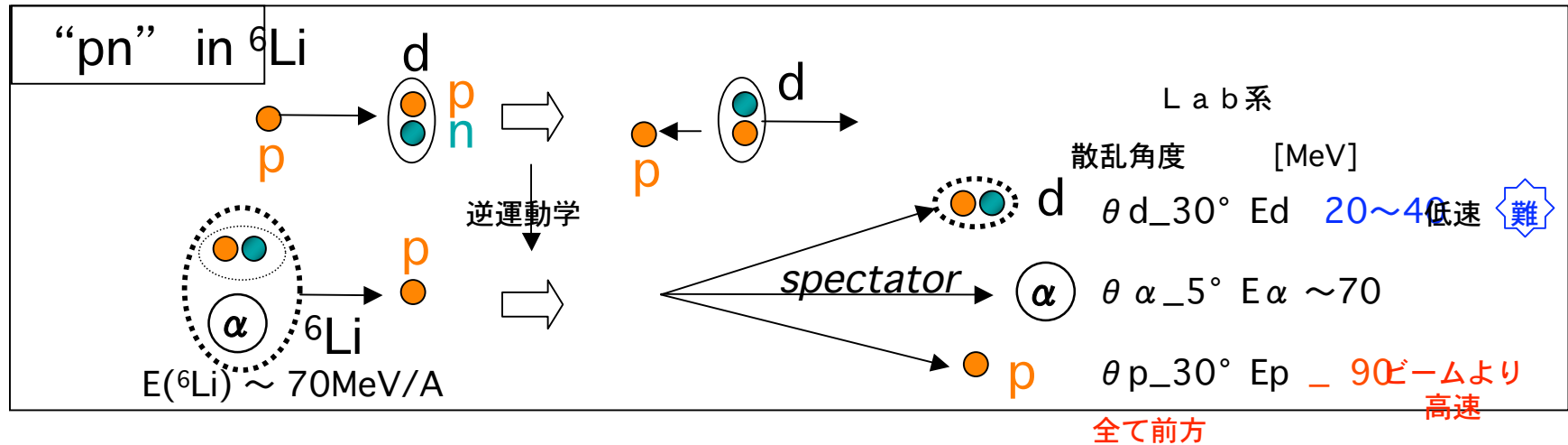


[N. T. Khai 君](#)



逆運動学での実験

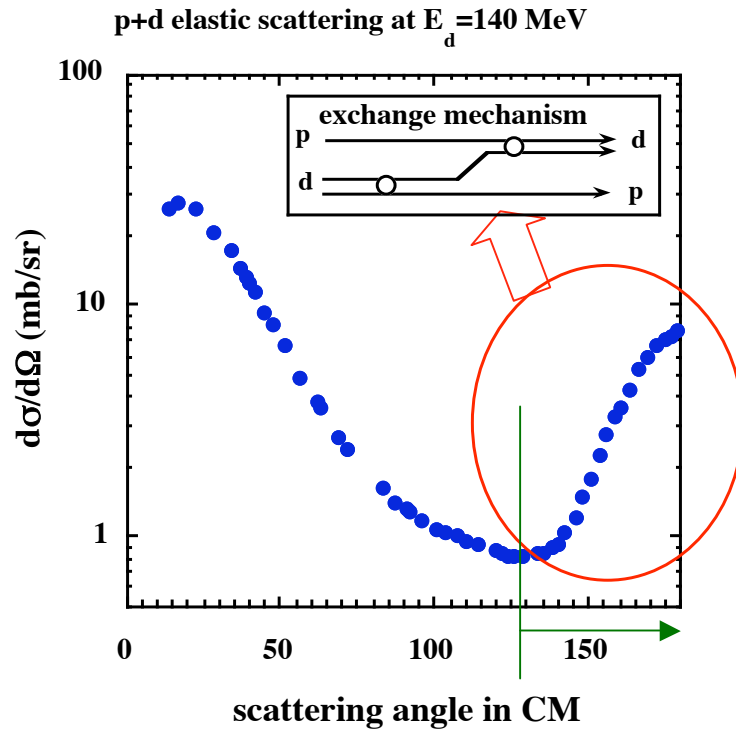
- * 核内2核子系(pn, nn) と、陽子標的との”後方”弾性散乱
- * α を spectator とした場合



d+p -> d+p 反応の運動学

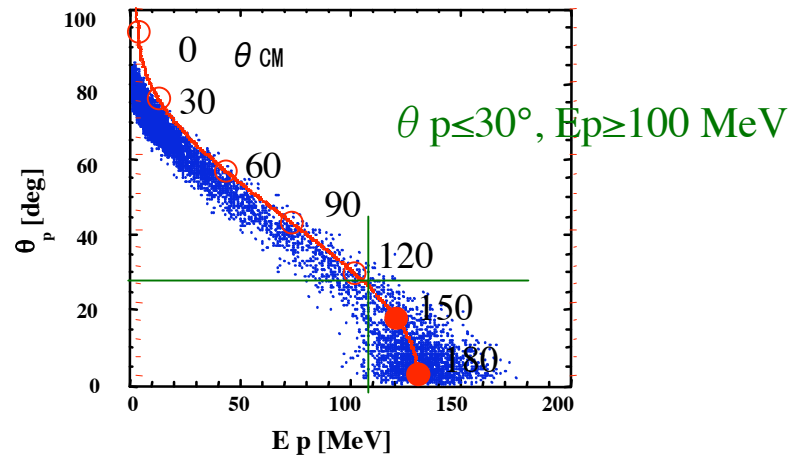
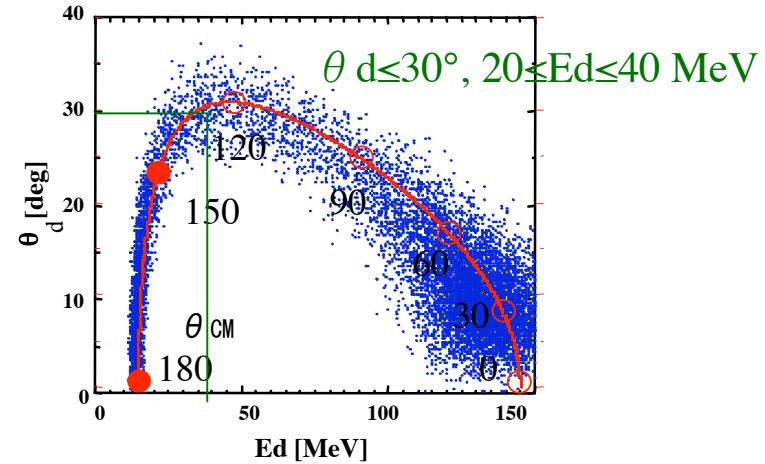
赤 : $E_d = 70 \text{ MeV/u}$ での運動学

青 : ${}^6\text{Li}$ 核内の重陽子 ('d' + p -> d+p) Fermi mom. $\sigma \sim 45 \text{ MeV/c}$

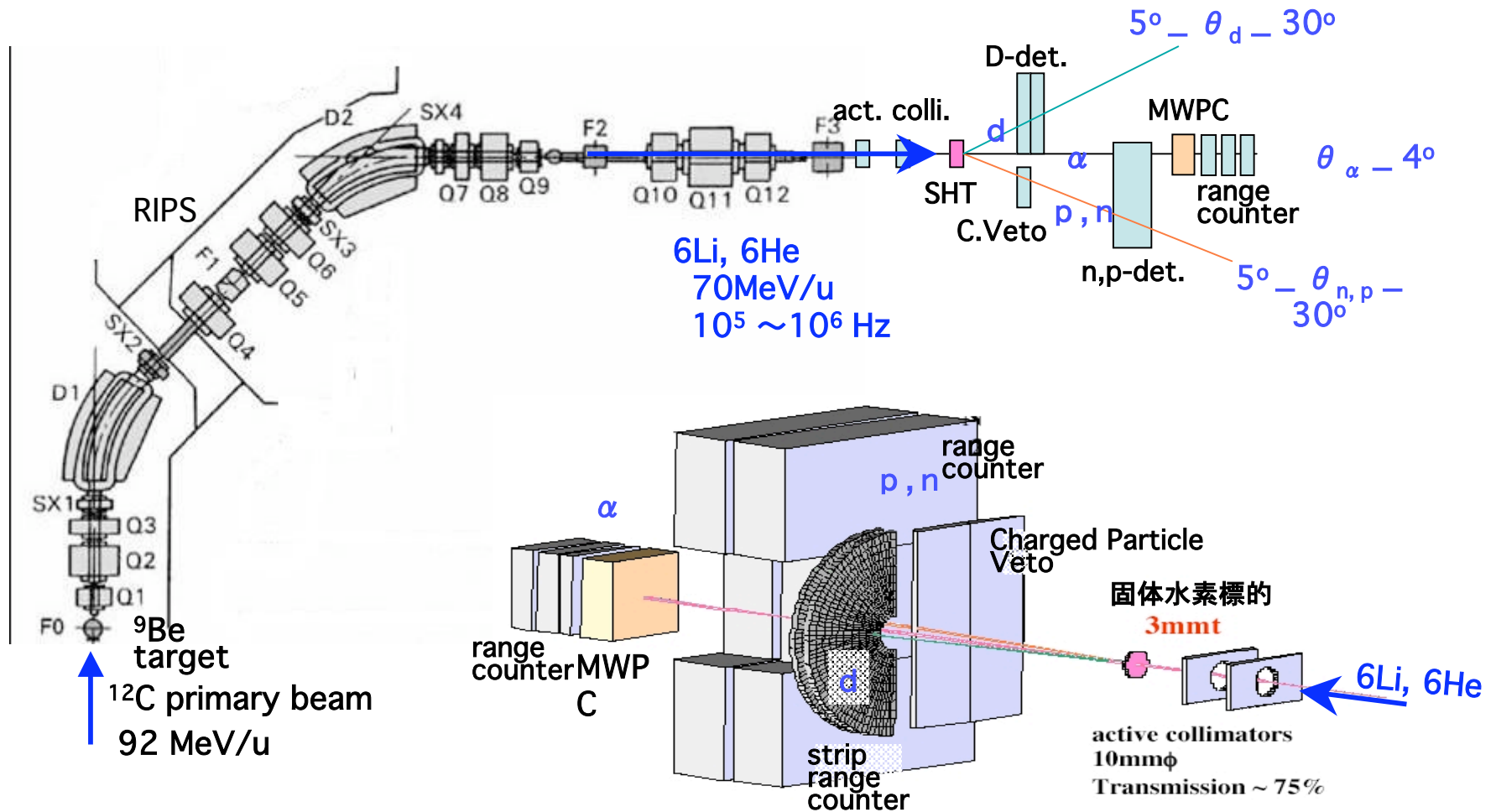


K. Sekiguchi et al., PRC 65,034003,2002

後方散乱 ($\theta_{\text{CM}} \geq 130^\circ$)

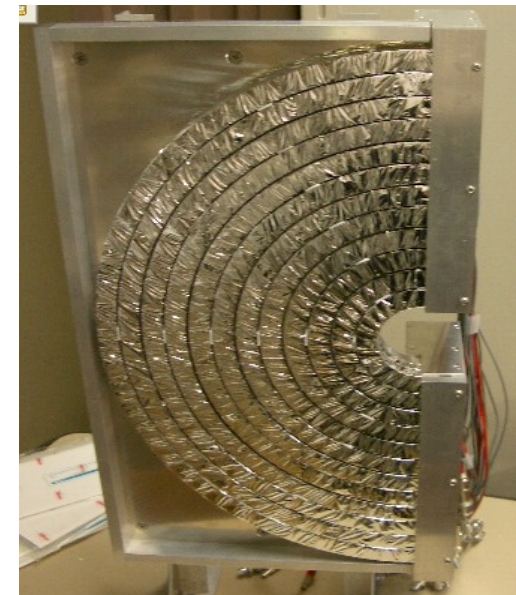
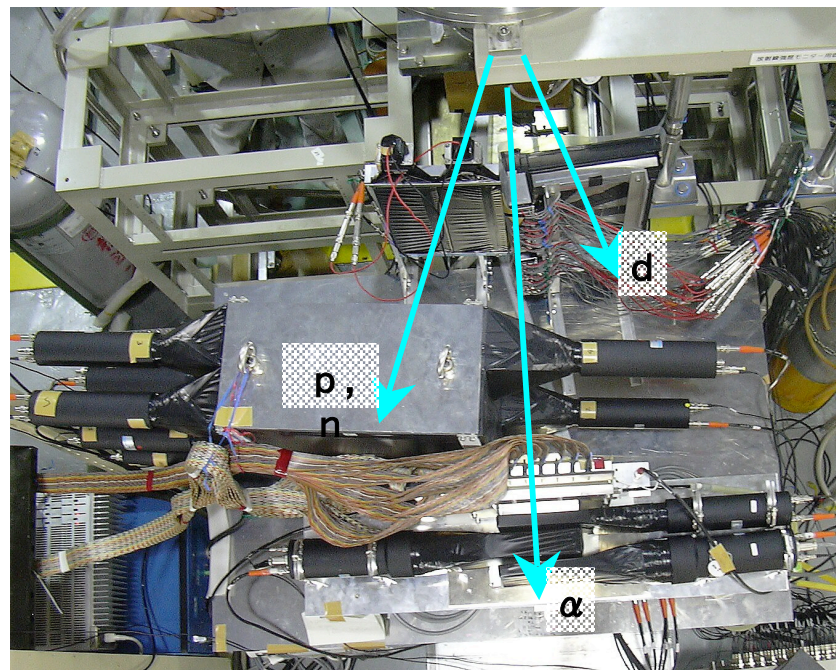
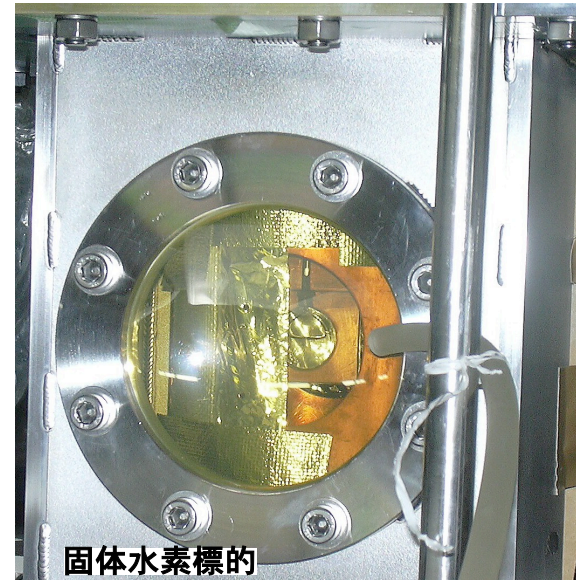
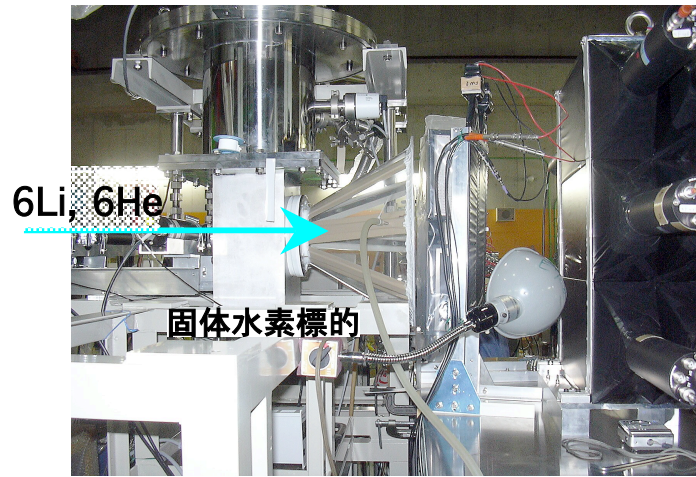


実験セットアップ



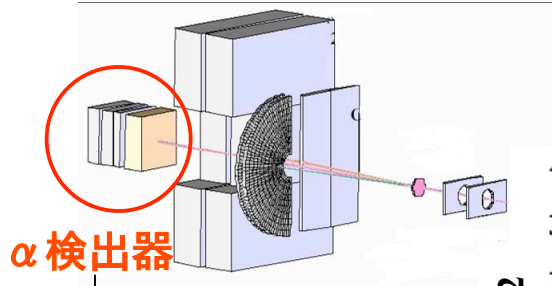
10^6 Hz での測定のため、
 検出器は、Plastic シンチレータを用いた。

実験装置



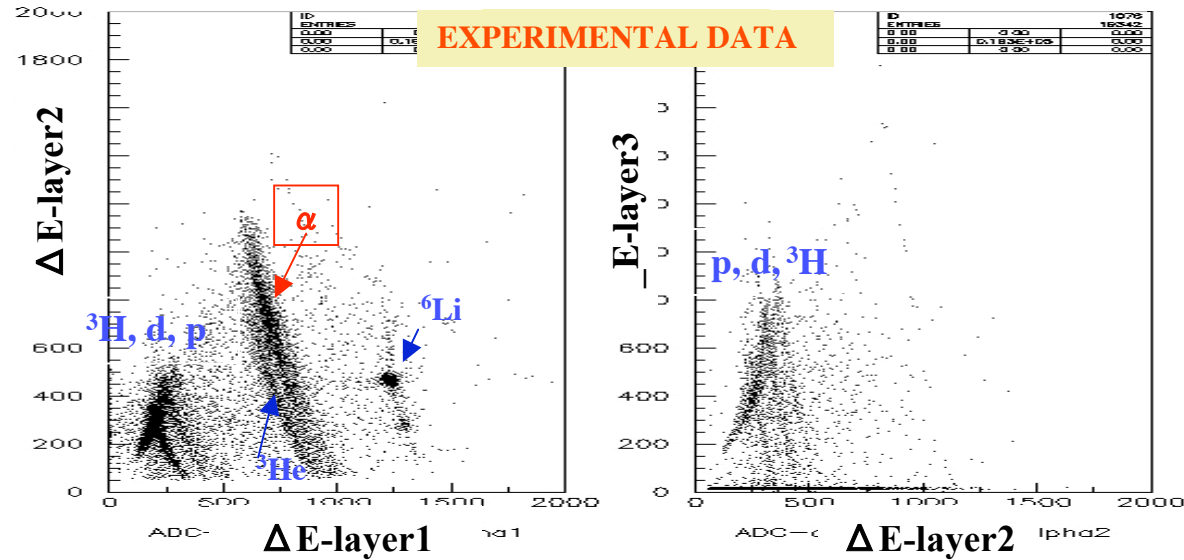
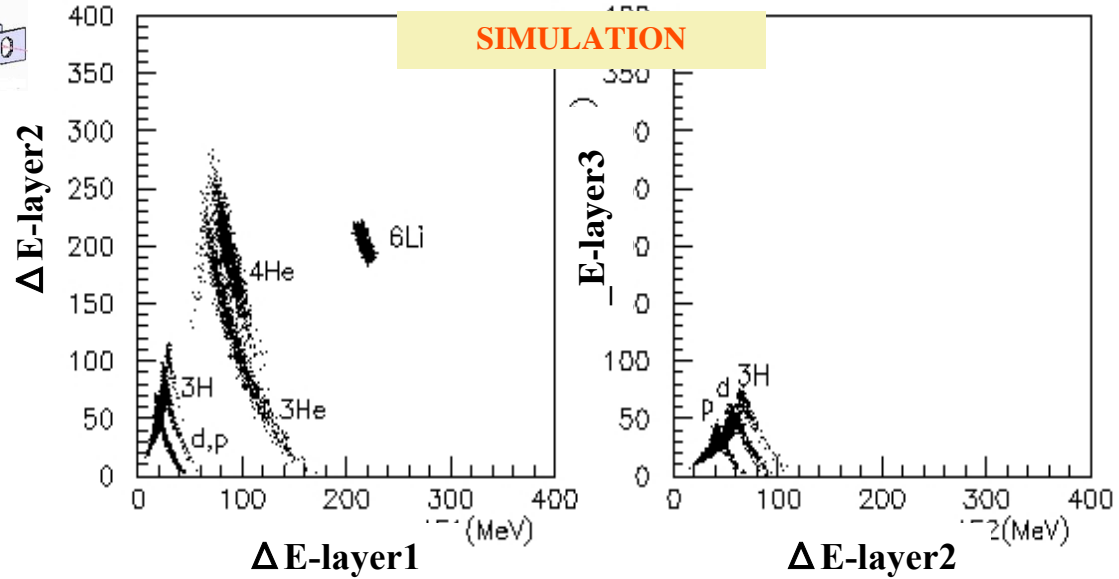
Low energy d 用 タマネギ型検出器 (2層)

超前方： α の識別

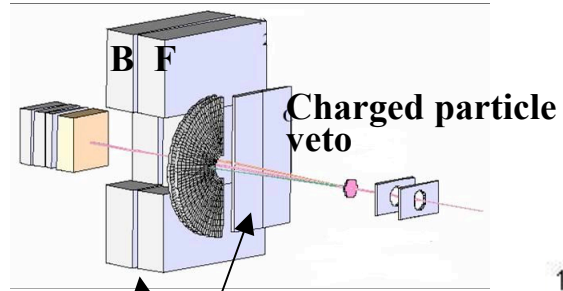


α 検出器

Plastic range counter
3-Layers : 20,40,20mm
thick

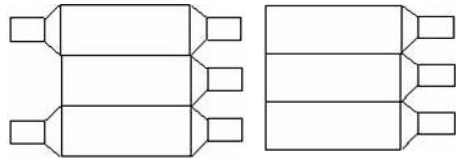


$\theta \sim 4^\circ$ の
 α を選択



p, n検出器

Thin plastic counter
(Charged particle ID)
+
Thick plastic range counter

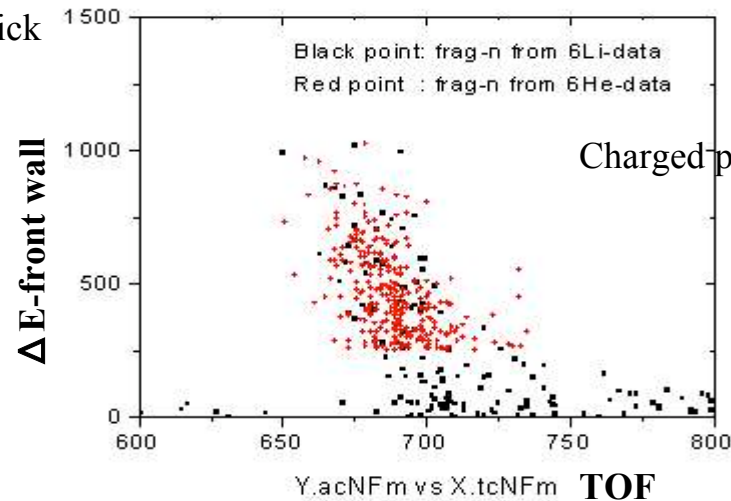
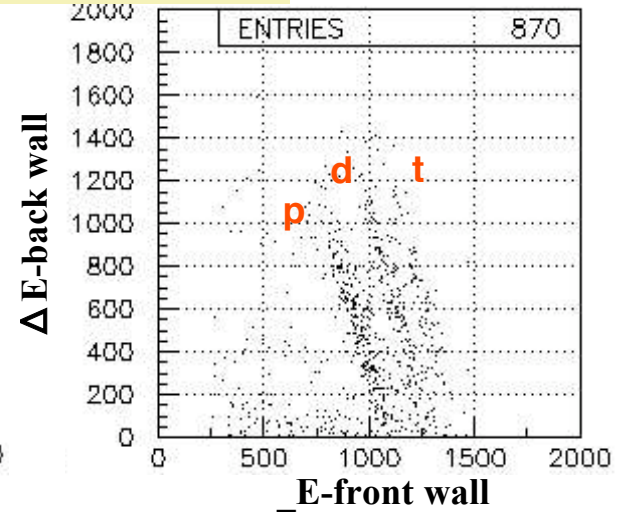
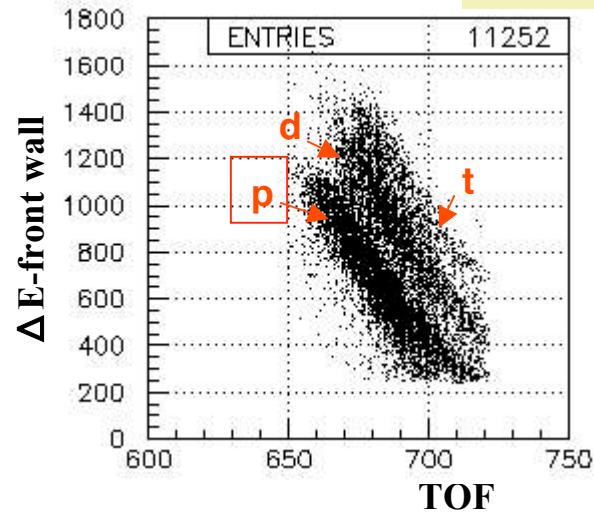


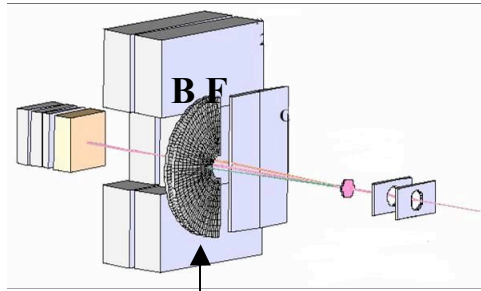
2-Layers : front, back 100, 100mm thick

$\theta = 5^\circ \sim 30^\circ$ の
p, n を選択

右前方 : p, nの識別

EXPERIMENTAL DATA



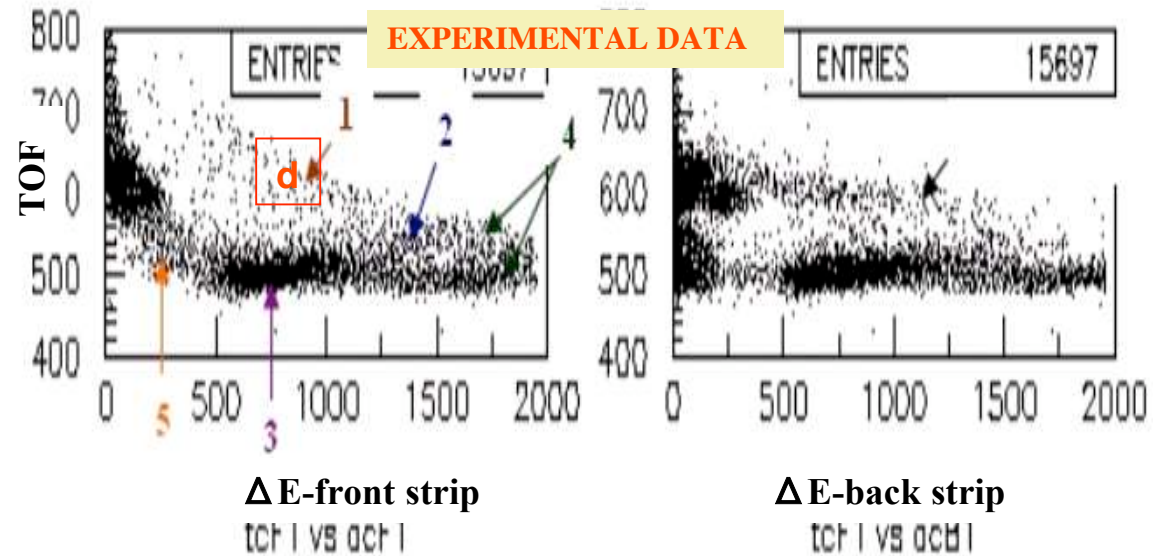
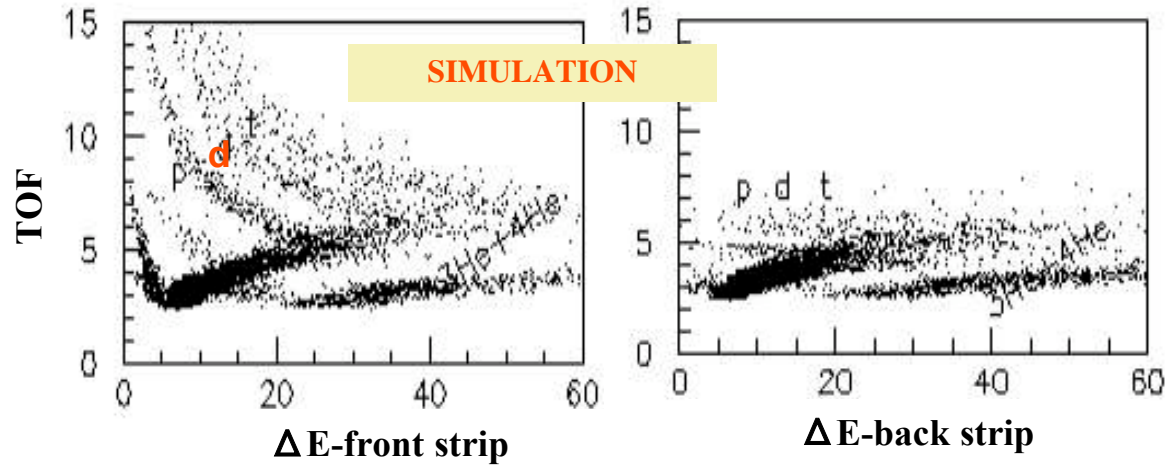


d検出器

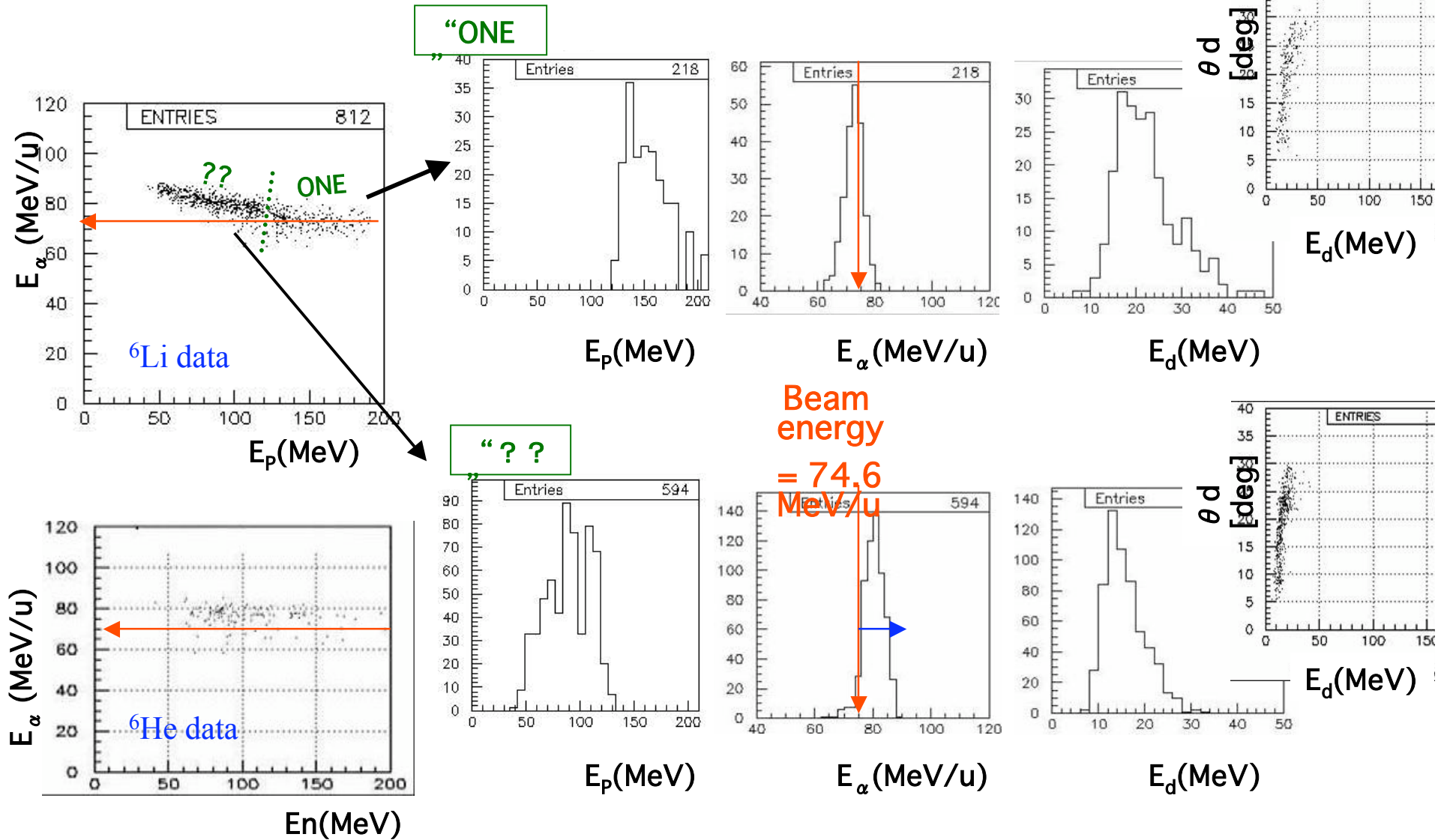
Plastic range counter
 タマネギ皮 x 12枚
 $\theta = 5^\circ \sim 30^\circ$ 、 2° step
 2 Layers : front, back 10, 10 mm thick

$\theta = 5^\circ \sim 30^\circ$ の
 low energy d
 を選択

左前方 : d の識別

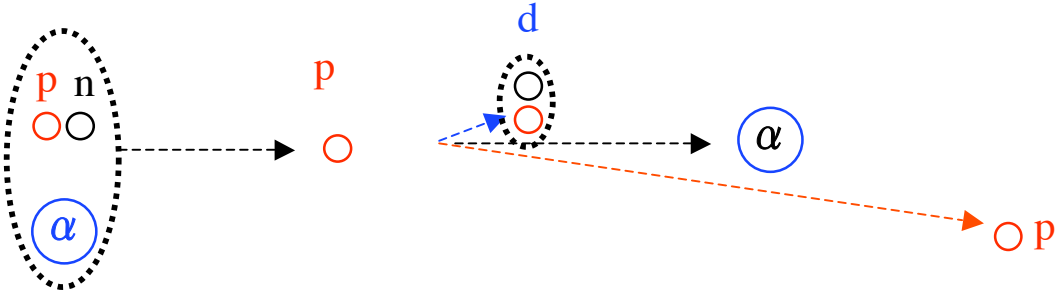


α, p, d coincidenceで解析



“ONE”

One Nucleon Exchange (ONE) Process



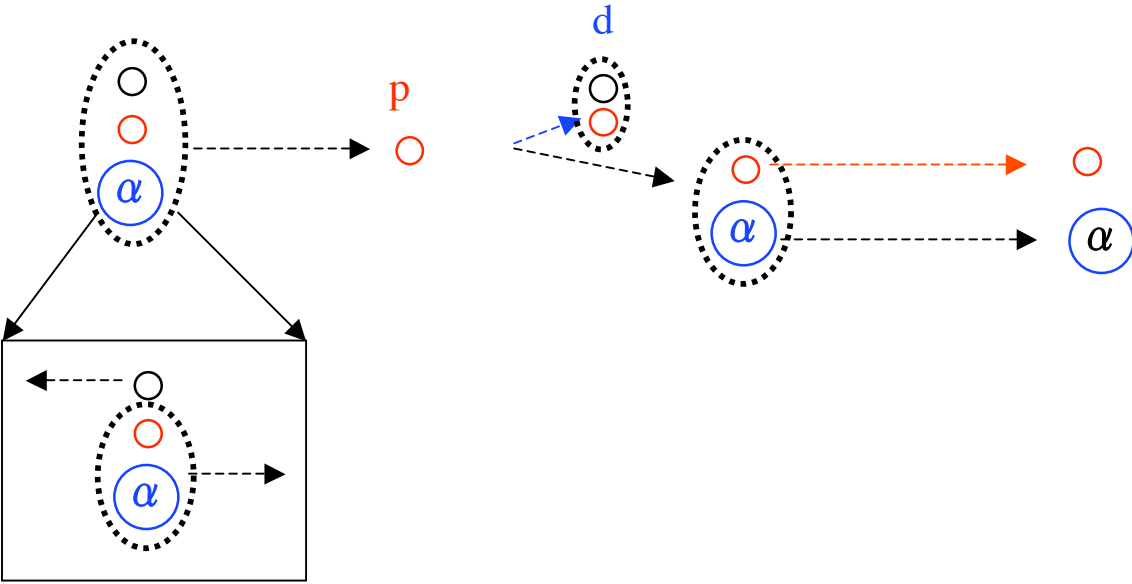
$$E_d \sim 20 \text{ MeV}$$

Spectator ($\sim 70 \text{ MeV/u}$)

$$E_p \sim 130 \text{ MeV}$$

“??”

“Two Step” process (${}^6\text{Li} + p \rightarrow d + {}^5\text{Li} \rightarrow d + p + \alpha$) を考えてみる

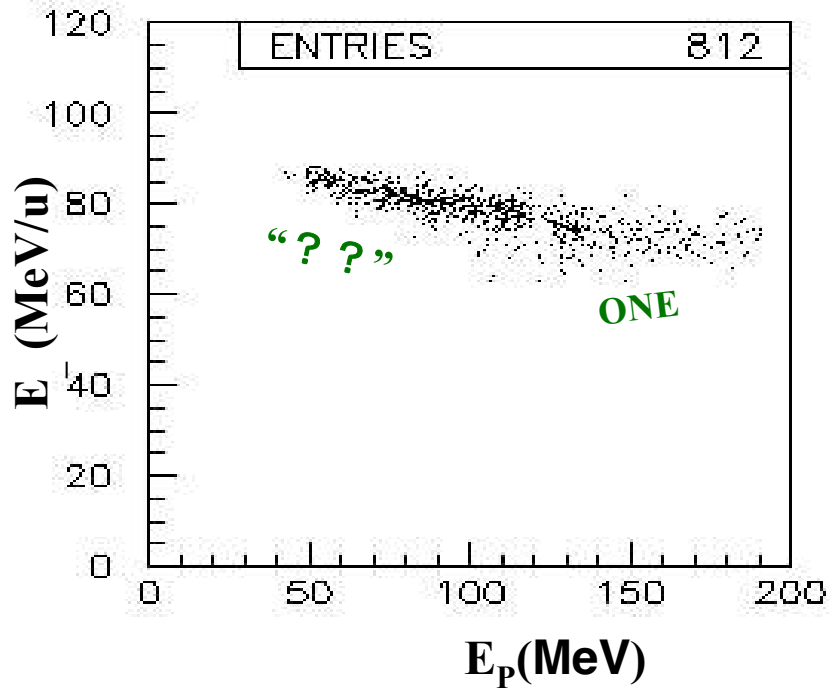


$$E_d \sim 20 \text{ MeV}$$

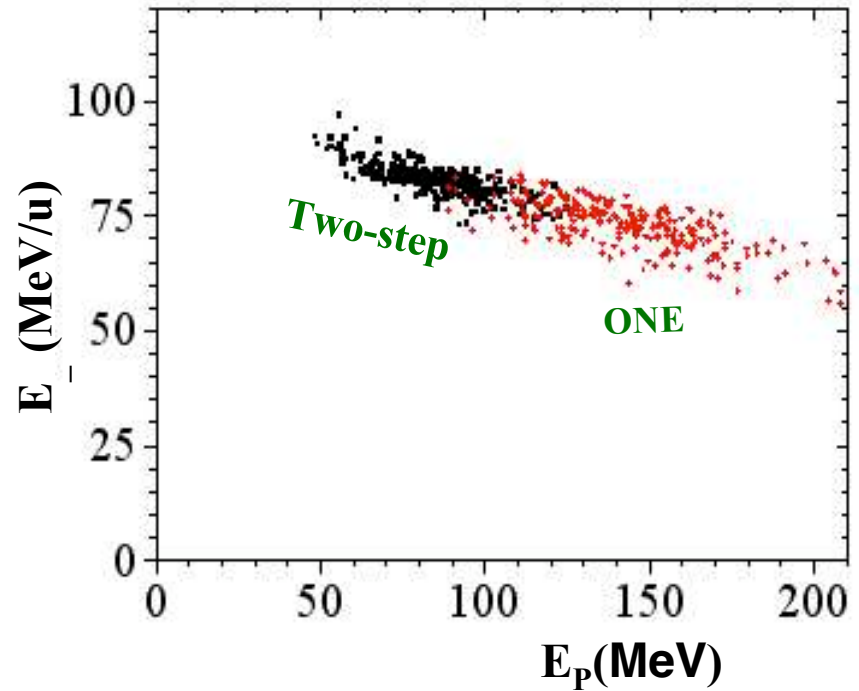
$$E_p \sim E_\alpha$$

$$E_\alpha > E_{beam} (70 \text{ MeV/u})$$

“??” を “Two-step” と考えた場合の、シミュレーション
 “Two Step” process (${}^6\text{Li} + p \rightarrow d + {}^5\text{Li} \rightarrow d + p + \alpha$)



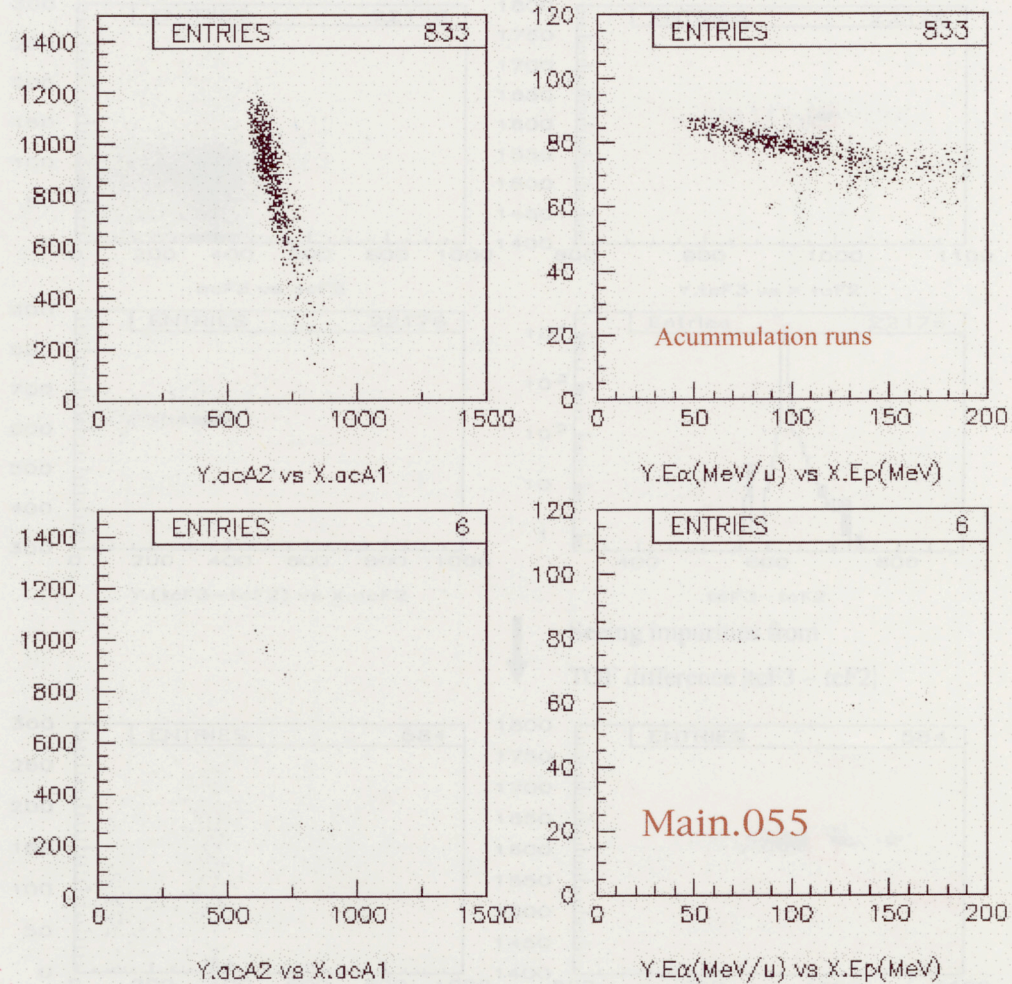
EXPERIMENTAL DATA



SIMULATION

ここでまた、
須田さんに
バトンタッチします。

Background analysis for ${}^6\text{Li}$ beam



ONE + unknown for accumulation runs (main.048, 053, 054, 050) and SHT-empty run (main.055)

3.1 Beam energy

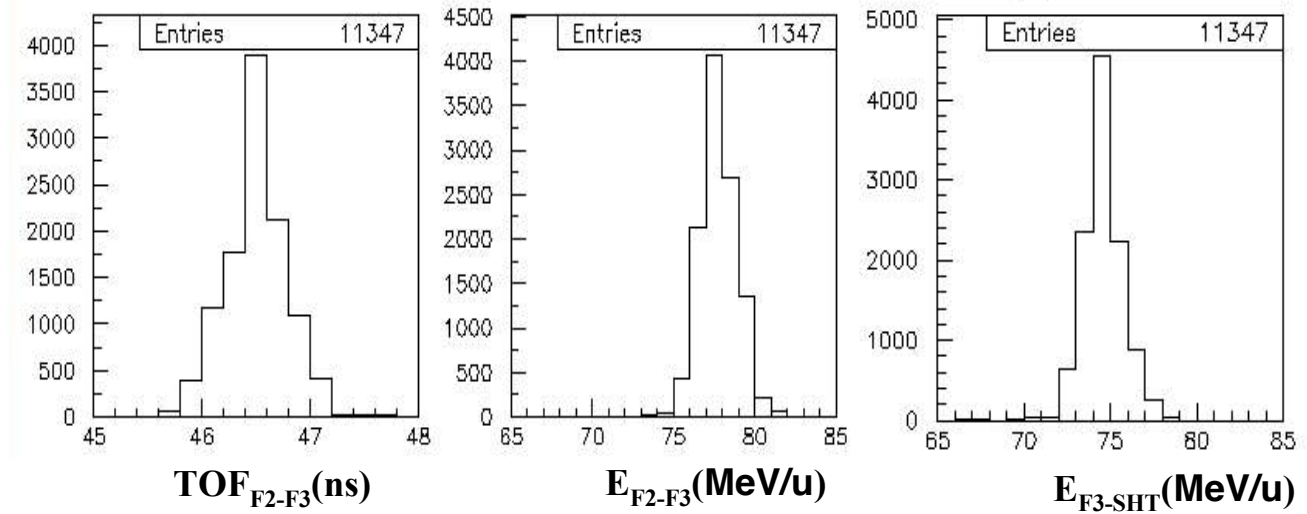


Fig. 10 Time-of-flight and energy spectra of ${}^6\text{Li}$ beam

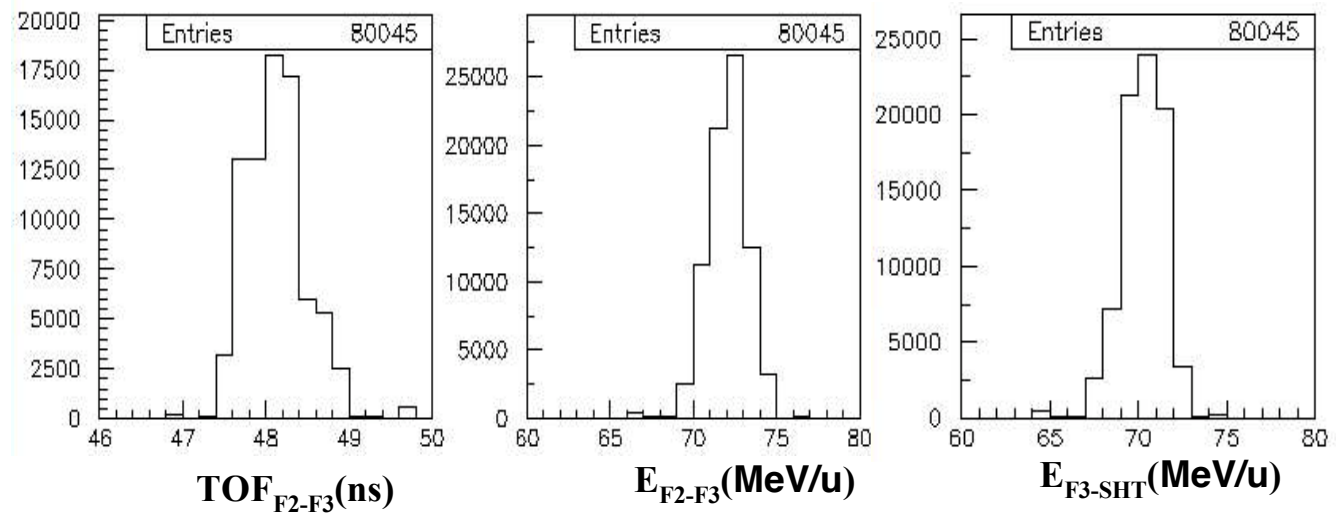


Fig. 10 Time-of-flight and energy spectra of ${}^6\text{He}$ beam

4.2 Beam identification

For ${}^6\text{He}$ -beam: impurities are ${}^8,9\text{Li}$

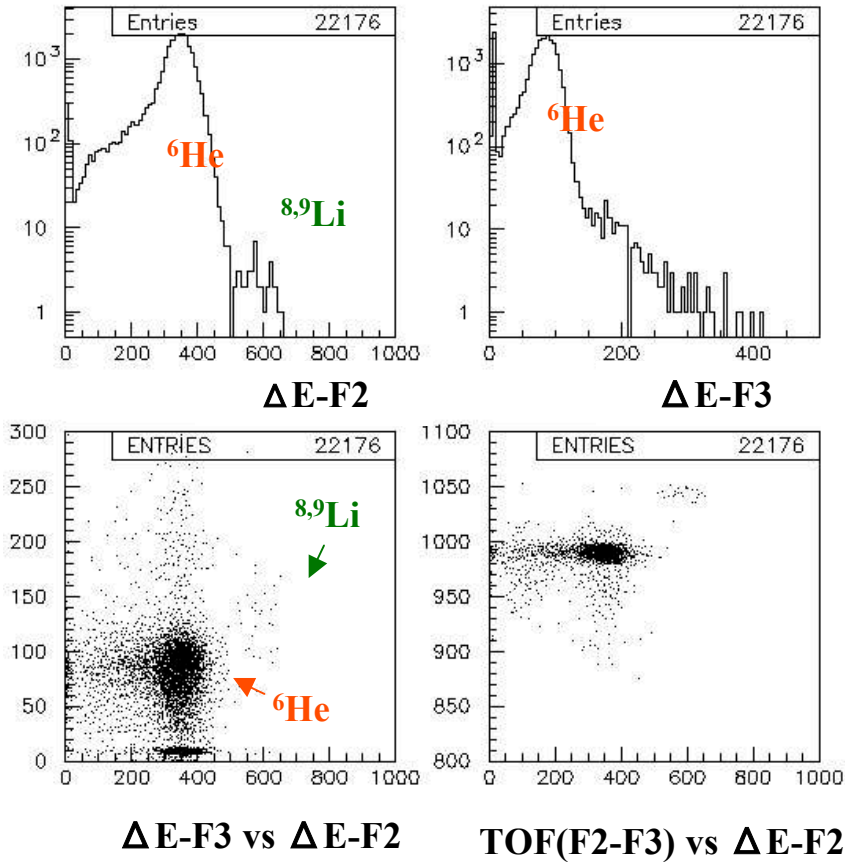


Fig. 7 ${}^6\text{He}$ -beam and impurities

For ${}^6\text{Li}$ -beam: impurities are ${}^4\text{He}$, ${}^7\text{Be}$

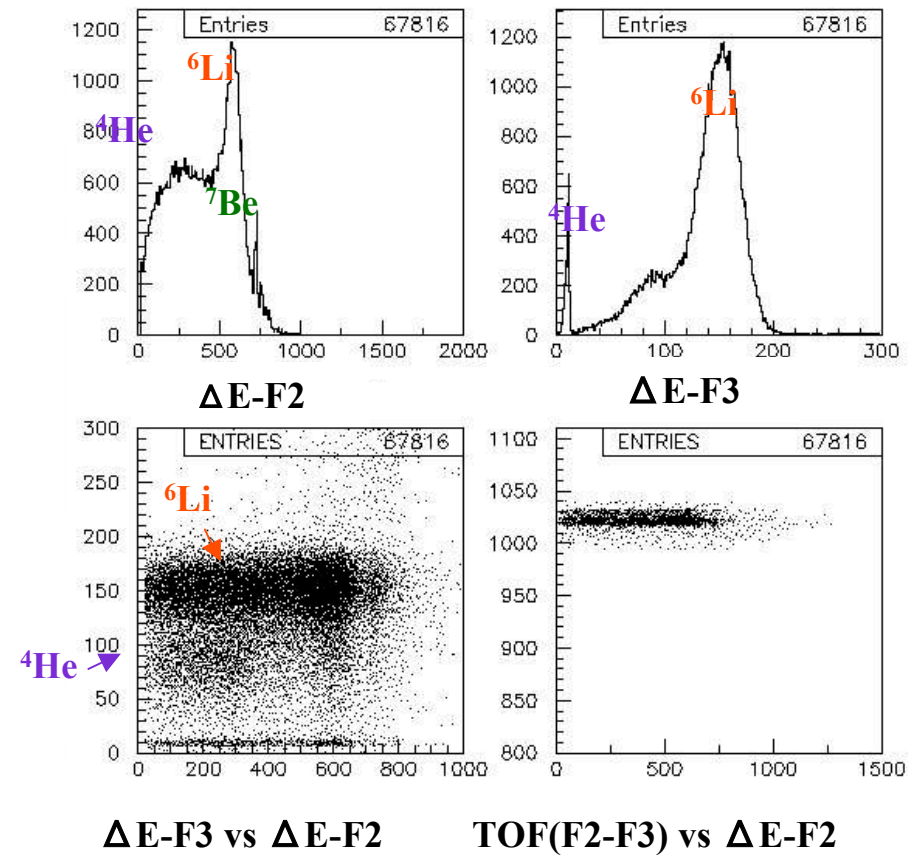


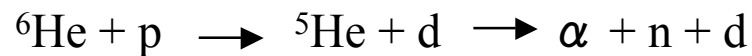
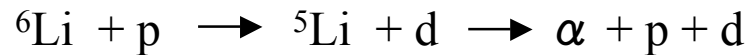
Fig. 8 ${}^6\text{Li}$ -beam and impurities

4.1 Interfered reactions

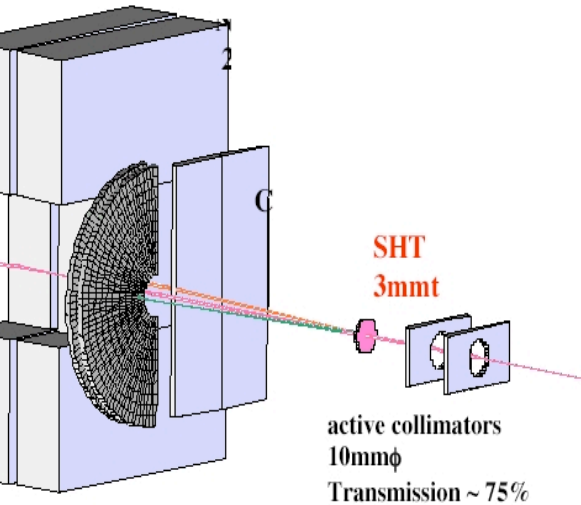
- Fragmentation of beam particles



- 1n-transfer reaction (two-step process) going through unbound ${}^5\text{Li}$ (or ${}^5\text{He}$) decaying into α -particle and p (or n)



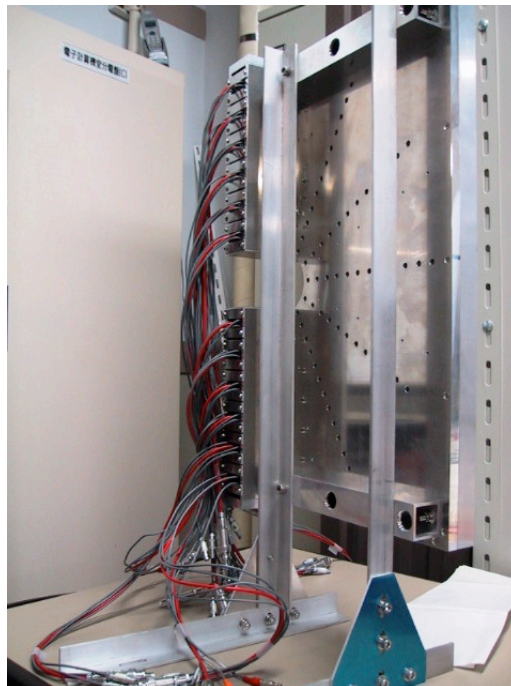
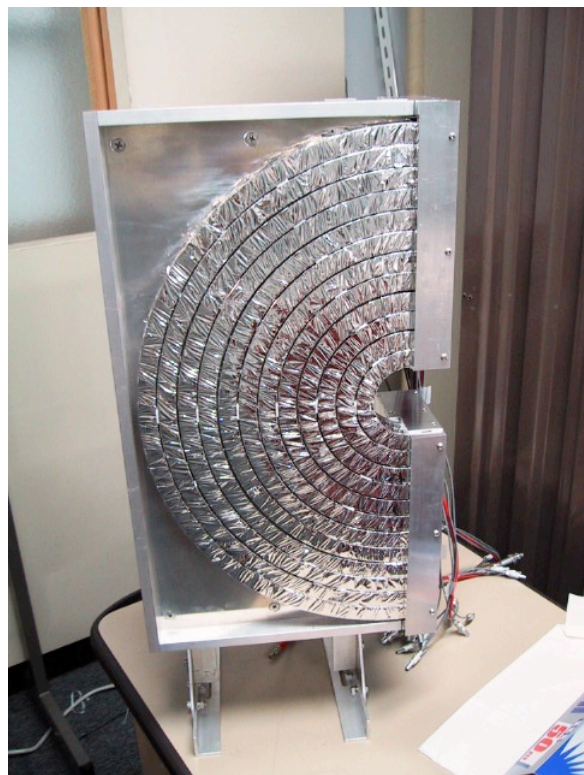
Two-step process



ONE reaction

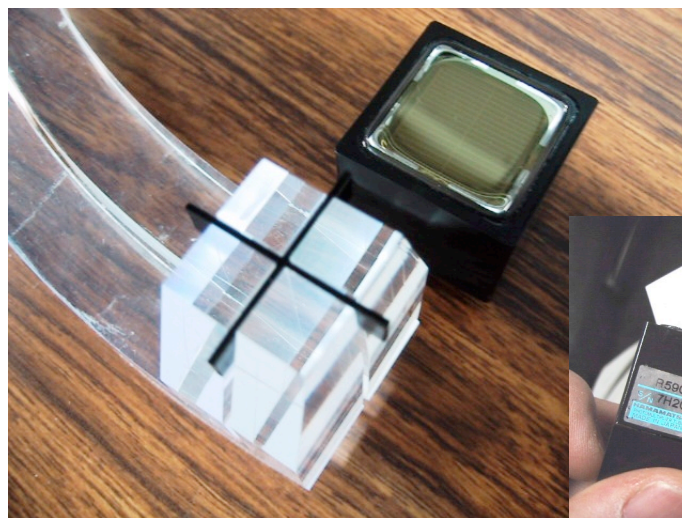


Main interference



d検出器

タマネギ皮 x 12枚
 $\theta = 5^\circ \sim 30^\circ$ 、 2° step
 2 Layers : front, back 10, 10 mm thick



00.076埋物WSの白田