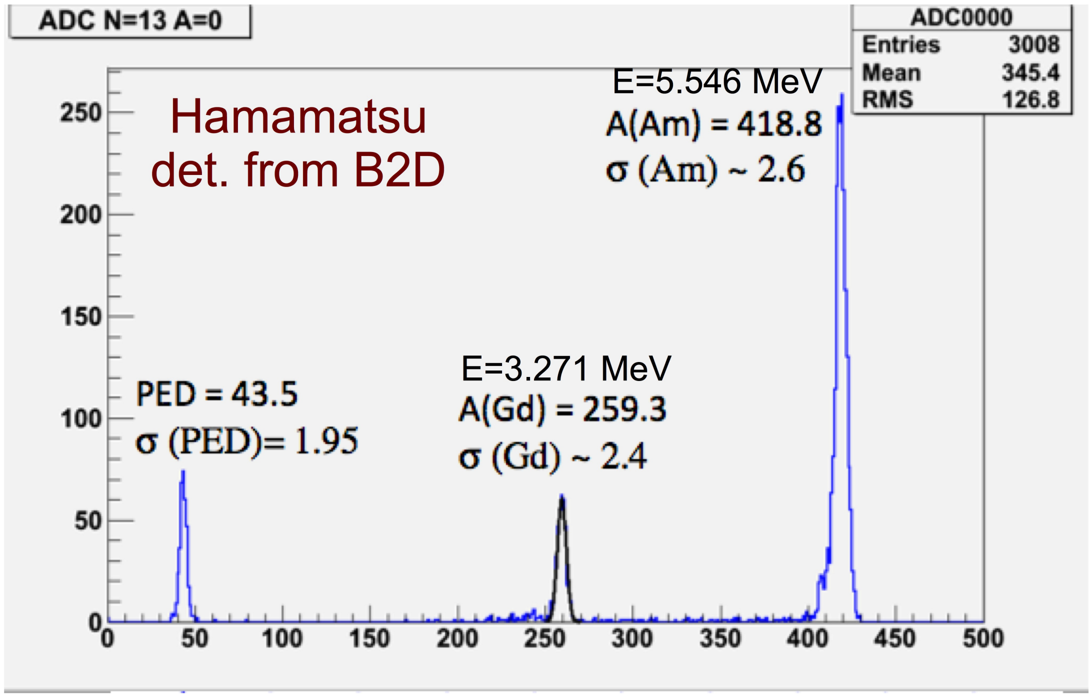
2 α peaks $\Rightarrow$ dead layer

- Grigor measured 2 α peaks:



- Write:

$$a_i = g(E_i - s_i \cdot \delta)$$

where:

a_i = ADC$_i$-PED (from peaks)

E_i = incident α energy (MeV)

g = gain (ADC/MeV)

s_i = stopping power for α with energy E_i in Si (MeV·cm^2/μg)

δ = dead layer (μg/cm^2)

- 2 α peaks: (a_1,E_1) & (a_2,E_2) $\Rightarrow$ solve: $\delta = (a_2 \cdot E_1 - a_1 \cdot E_2)/(a_2 \cdot s_1 - a_1 \cdot s_2)$ somebody please check my algebra
- From NIST:

```
ASTAR: Stopping Powers and Range Tables for Alpha Particles

SILICON

Kinetic    Total
Energy     Stp. Pow.
MeV        MeV cm2/g

3.271E+00  8.042E+02
5.546E+00  5.770E+02
```

from NIST $\Leftarrow$

- Plugging in #'s:

δ = 160 μg/cm^2

- But: δ inaccurate, numerator difference of large #'s

2 α peaks $\Rightarrow$ dead layer

- Uncert. on ADC-peak: σ(ADC-peak); 1 count should be overestimate
- Then uncert. on δ: $\sigma(\delta)$ = 50 μg/cm^2 $\times$ σ(ADC-peak)

- From 2-α's: δ = 160 μg/cm^2
- From Dima's DL fits for Hamamatsu's: $\delta \approx$ 20-45 μg/cm^2 (next slide)
- Big discrepancy
- Is σ(ADC-peak) large?

  If σ(ADC-peak) = 1 count, off by ~2½ σ, ~OK
- ADC/preamp nonlinearity???

- Would be good to understand this...

Dead layer from banana fits Hamamatsu detectors