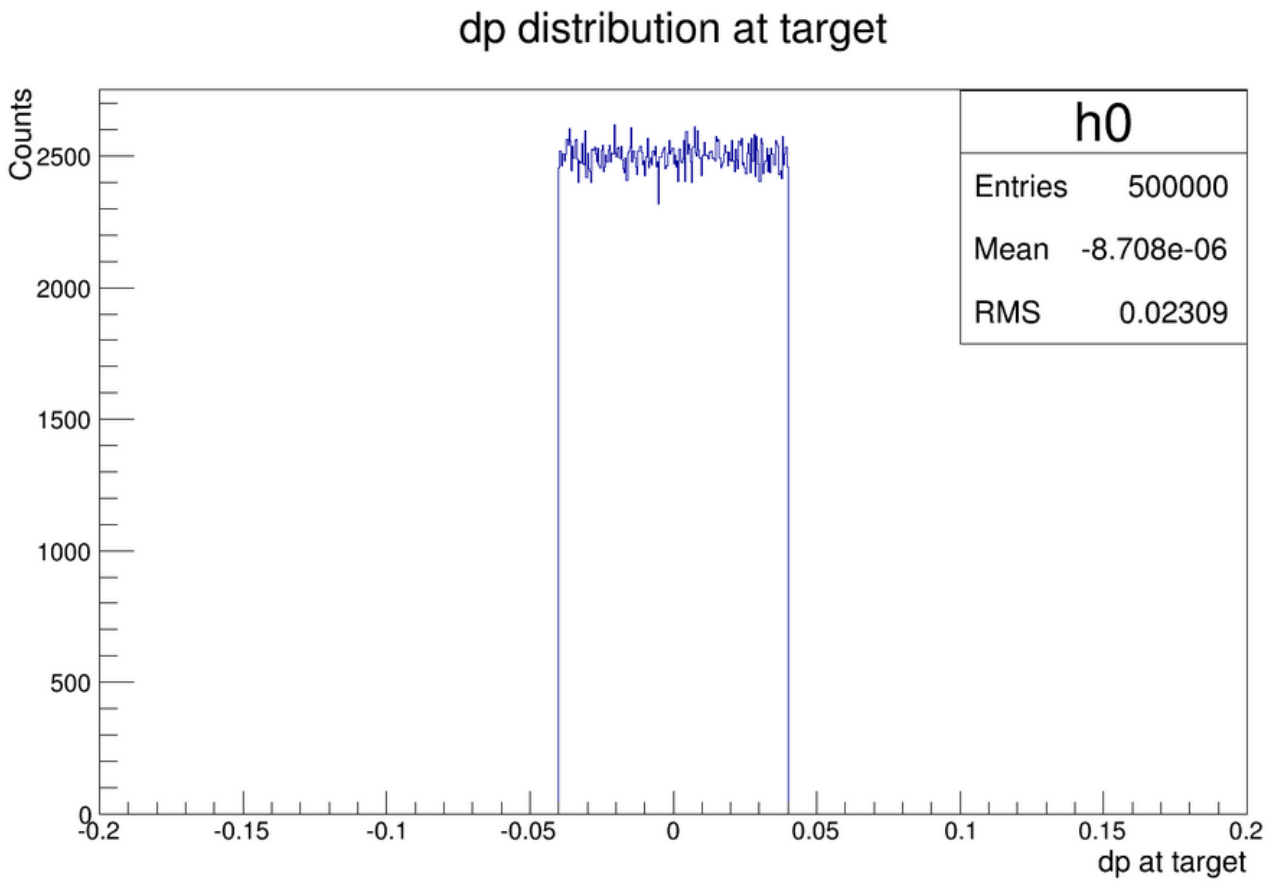
Packing Fraction Updated

a. Simulation package updated
- ✓ Material (cell+ windows+…)
- ✓ Energy loss
- ✓ Multiple scattering

b. Packing Fraction

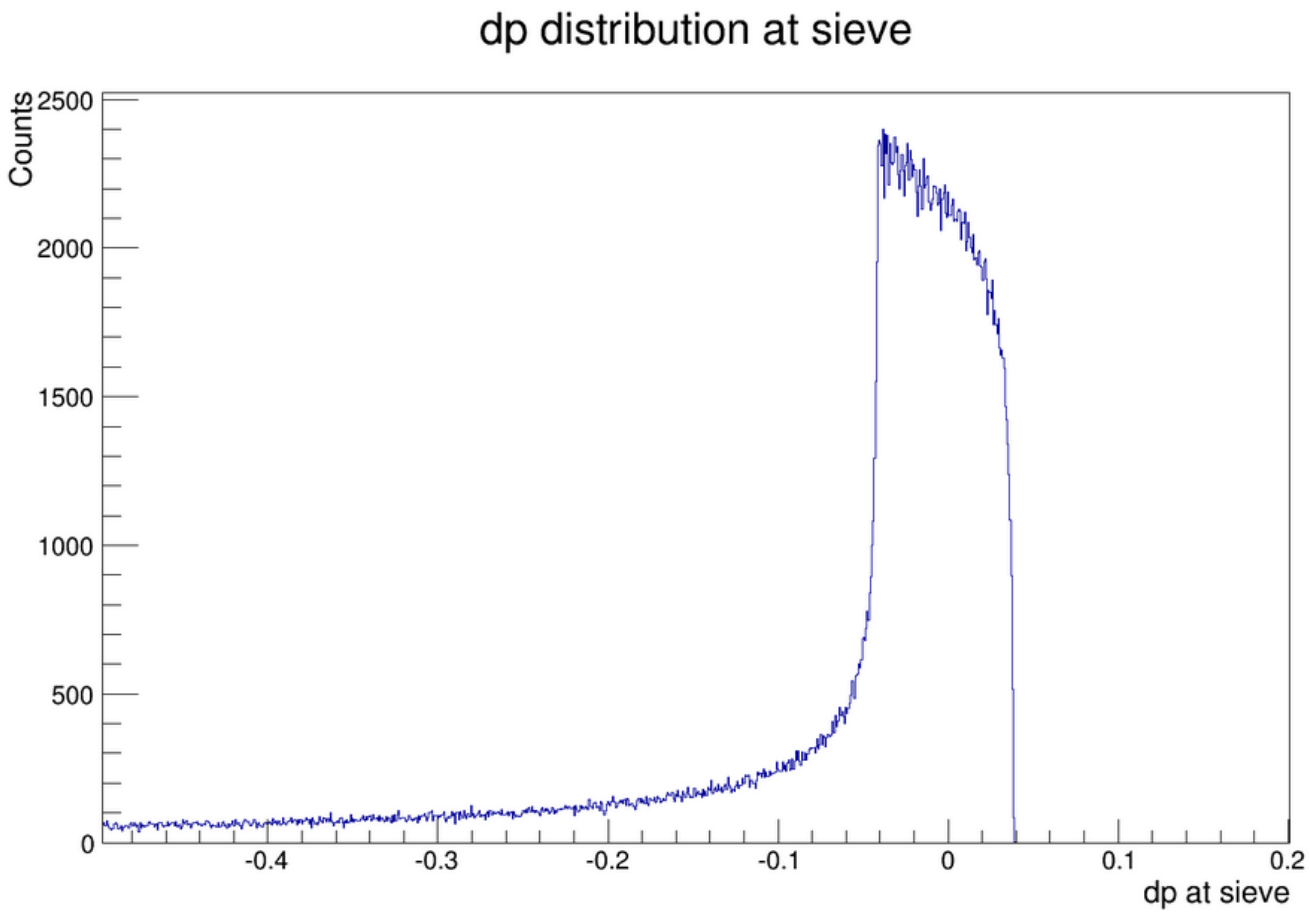
Dp distribution from gererator

- Events generate from the target
- Cover the cell range and abs(dp)<0.04, abs(th)<-75e-3, abs(ph)<-10e-3, raster 1.4mm
- No target field, E=2.253207GeV P=2.249407Gev/c



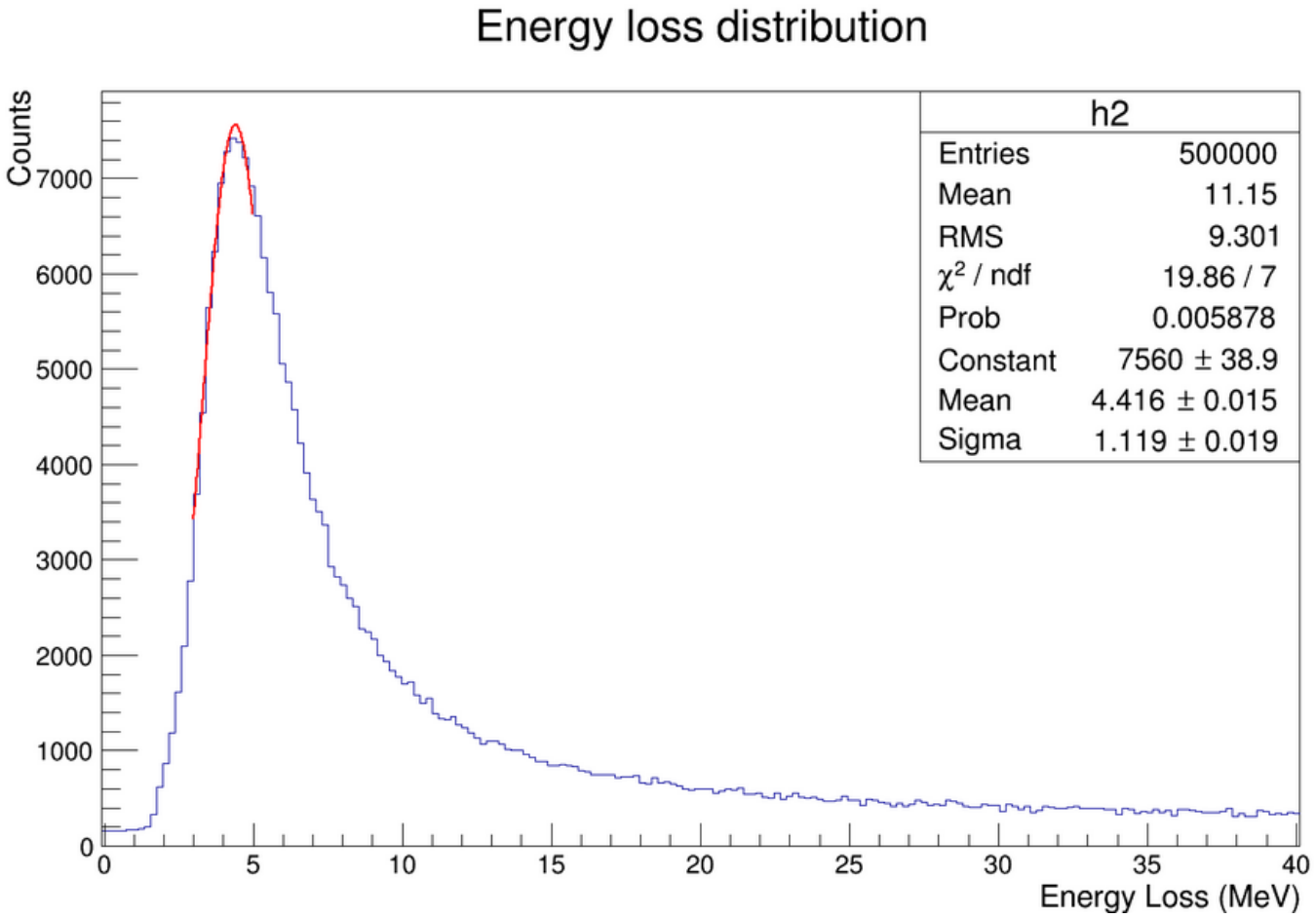
Dp distribution at sieve

- Energy loss due to cell, LHe,Al, He and …
- Include the energy loss from HRS entrance window



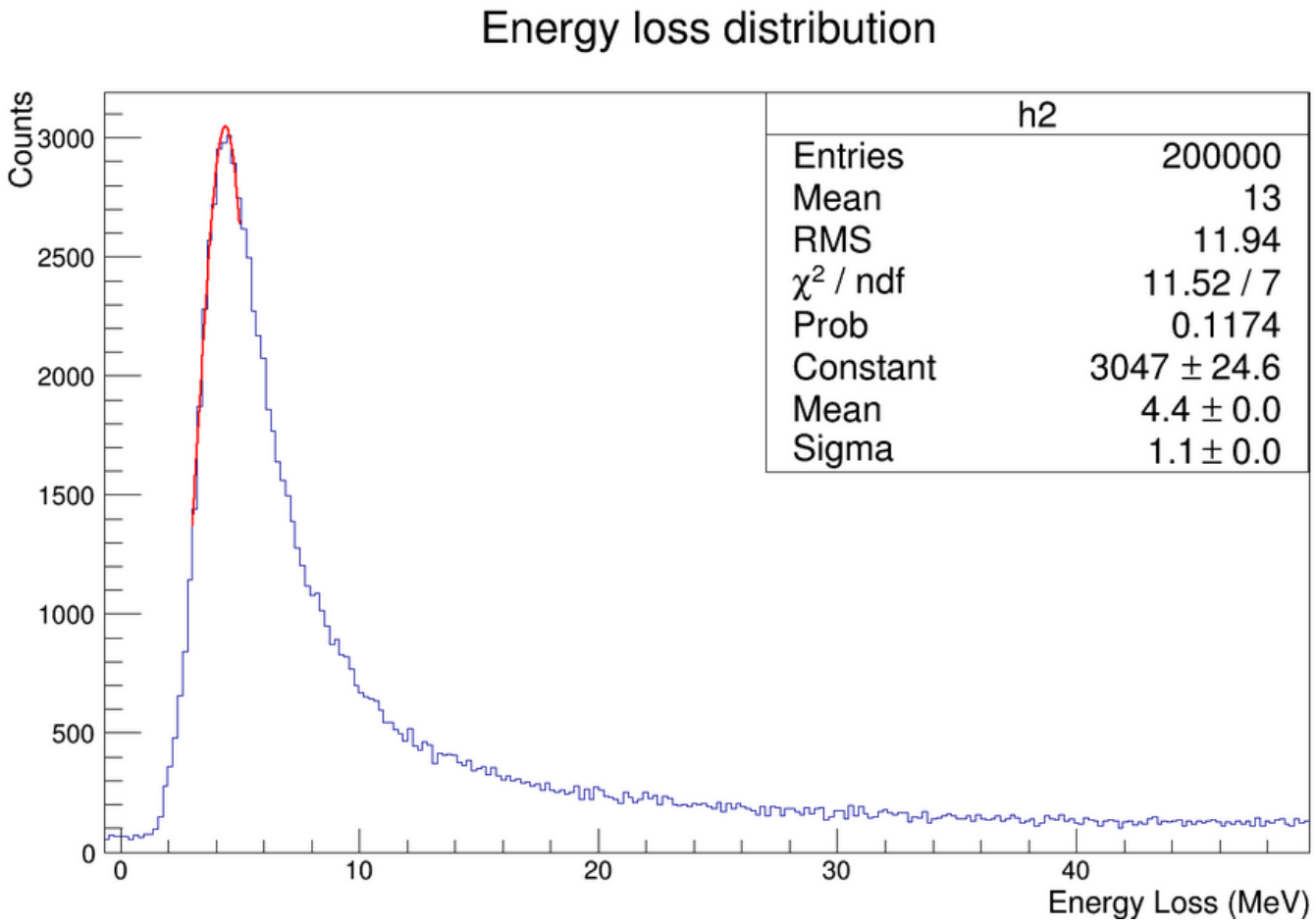
Energy loss distribution at sieve

- Setting E=2.253207GeV P=2.249407Gev/c …
- HRS angle 5.65°
- No target field, multiple scattering included.



Energy loss distribution at sieve

- Setting E=2.253207GeV P=2.249407Gev/c …
- HRS angle 5.65°
- No target field, multiple scattering NOT inculuded.



B. Packing Fraction

- relative volume ratio of ammonia to LHe in the target cell
- also related the total yields as follows

$$Y_t = I_{beam}A_{HRS}(\frac{d_{NH_3}}{M_{NH_3}}T_{cell}\text{*pf*}(3*\sigma_H+\sigma_N)+\frac{d_{He}}{M_{He}}*$$

$$T_{cell}\text{*(1-pf)}*\sigma_{He}+\frac{d_{He}}{M_{He}}*T_{out}*\sigma_{He}+\frac{d_{Al}}{M_{Al}}*T_{Al}*\sigma_{Al}+\ldots)$$

$$= I_{beam}A_{HRS}(\frac{d_{NH_3}}{M_{NH_3}}*(3*\sigma_H+\sigma_N)-\frac{d_{He}}{M_{He}}*\sigma_{He})T_{cell}\text{*pf} +$$

$$\frac{d_{He}}{M_{He}}*(T_{cell}+T_{out})*\sigma_{He}+\frac{d_{He}}{M_{He}}*T_{out}*\sigma_{He}+\frac{d_{Al}}{M_{Al}}*T_{Al}*\sigma_{Al}+\ldots)$$

$$= m*pf+b$$

A linear function $Y_t \sim pf$, tune rates to get pf ⟶ to do next

Also check energy loss