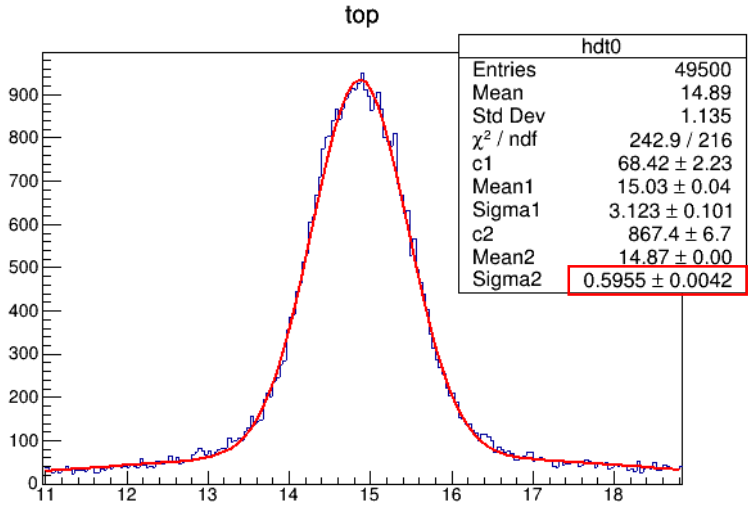
Weekly Meeting

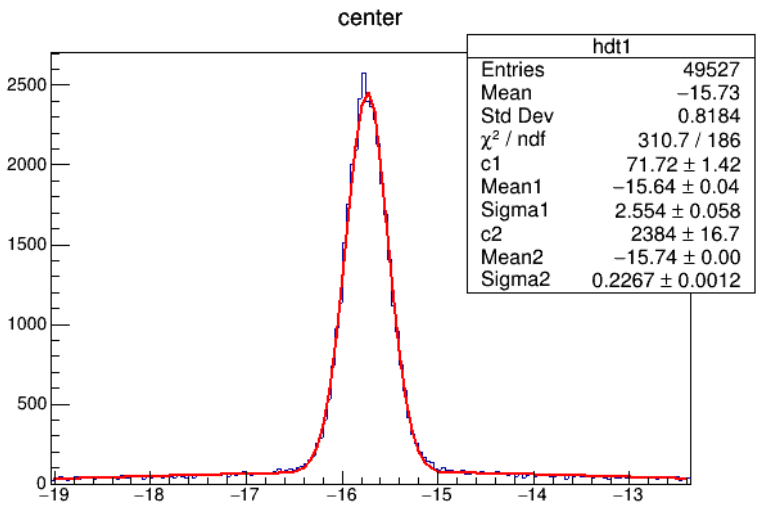
27/12/2019

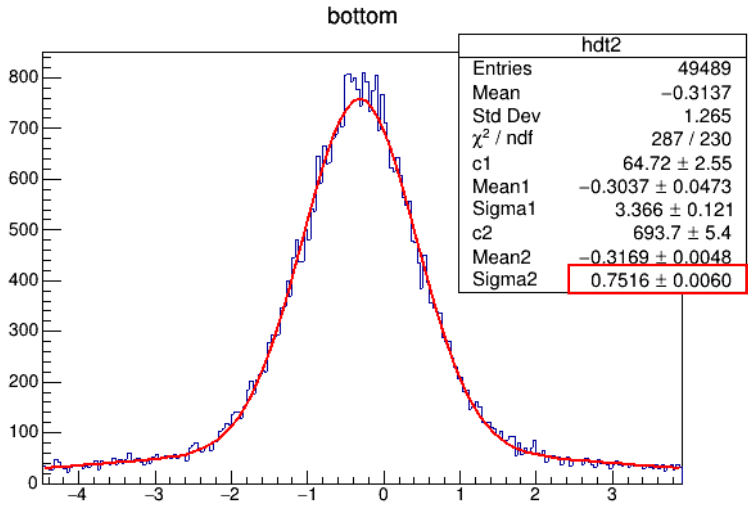
ByungChan Lee

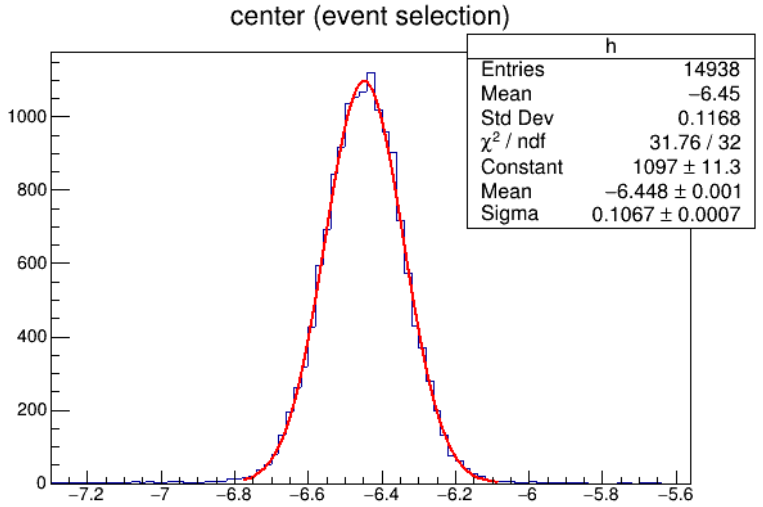
Time Resolution – Position

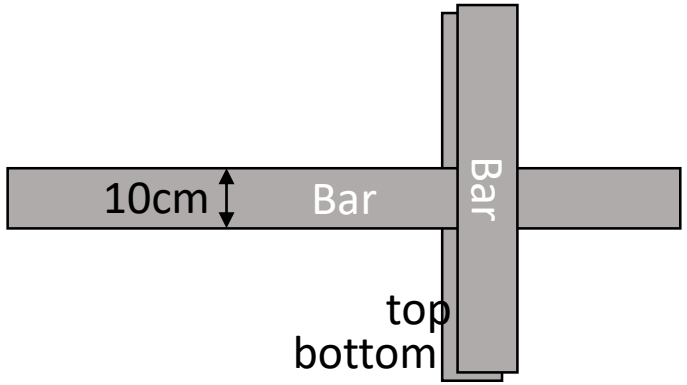
Previous slide











- Δt0(L-R) hist of the bottom counter shows larger sigma value

- FWHM ~ 2.355σ

170cm – 22ns

10.0cm – 1.40ns

13.7cm – 1.77ns

Multiple Scattering - MACRO

$$\sigma_{\text{proj}}^{\text{MS}} \simeq \frac{X}{\sqrt{3}} \frac{0.0136}{p\beta c} \sqrt{\frac{X}{X_0}} (1 + 0.038 \ln(X/X_0))$$

- σ ≅ 0.1cm/E (GeV) (X=20cm)
- σ ≅ 1.5cm/E (GeV) (X=120cm)

(β=1, cosθ = 1, X_0=43.9cm)

$< E_\mu > = 320\text{GeV}$

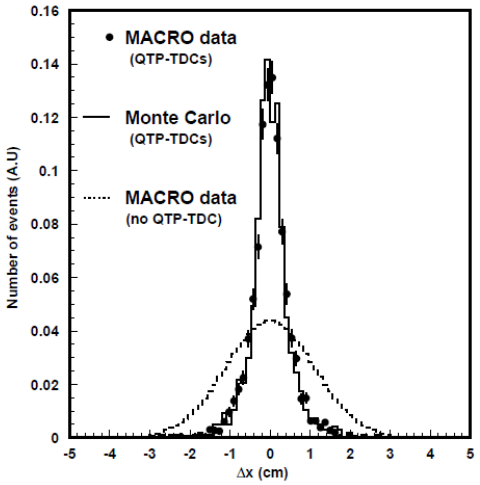


Fig. 7. MACRO data: residuals distribution obtained using the MACRO QTP–TDCs ($\sigma = 3$ mm) compared with the Monte Carlo, GEANT-based, expectation. The dotted line represents the residuals obtained using the MACRO streamer tube system in digital mode ($\sigma = 1$ cm).

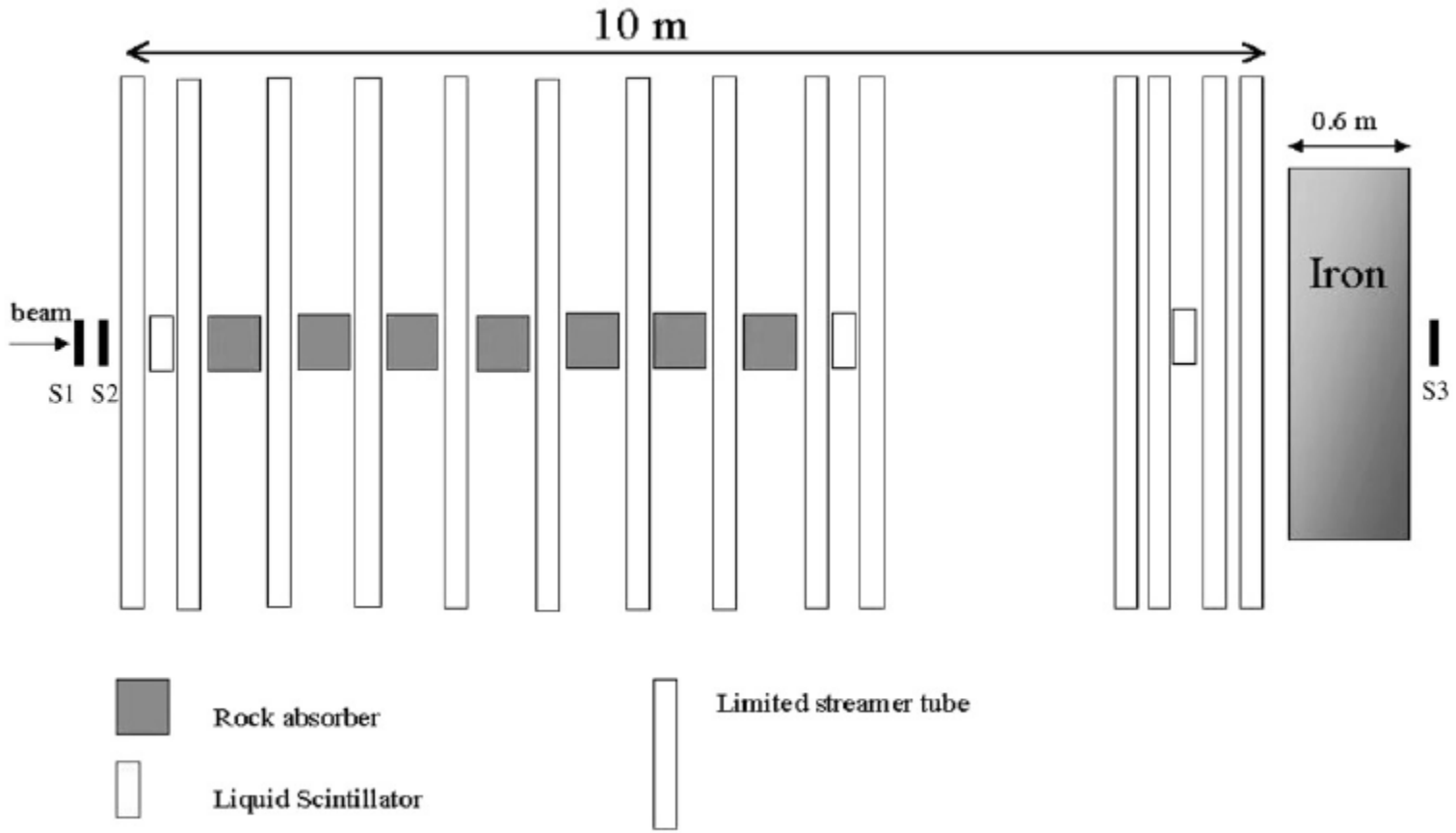


Fig. 2. Test beam layout at PS-T9: the trigger is provided by the fast coincidence of the scintillators S1, S2, S3.

Multiple Scattering – MICE

$$\theta_0 \approx \frac{14\ \mathrm{MeV/c}}{p_\mu \beta}\sqrt{\frac{z}{X_0}}$$

- θ ≅ 0.54° /E (GeV) (X=20cm)
- θ ≅ 1.33° /E (GeV) (X=120cm)

(β=1, cosθ = 1, X_0=43.9cm)

θ ~ 1° : Δx ~ 0.18cm (20cm)
: Δx ~ 1.05cm (120cm)

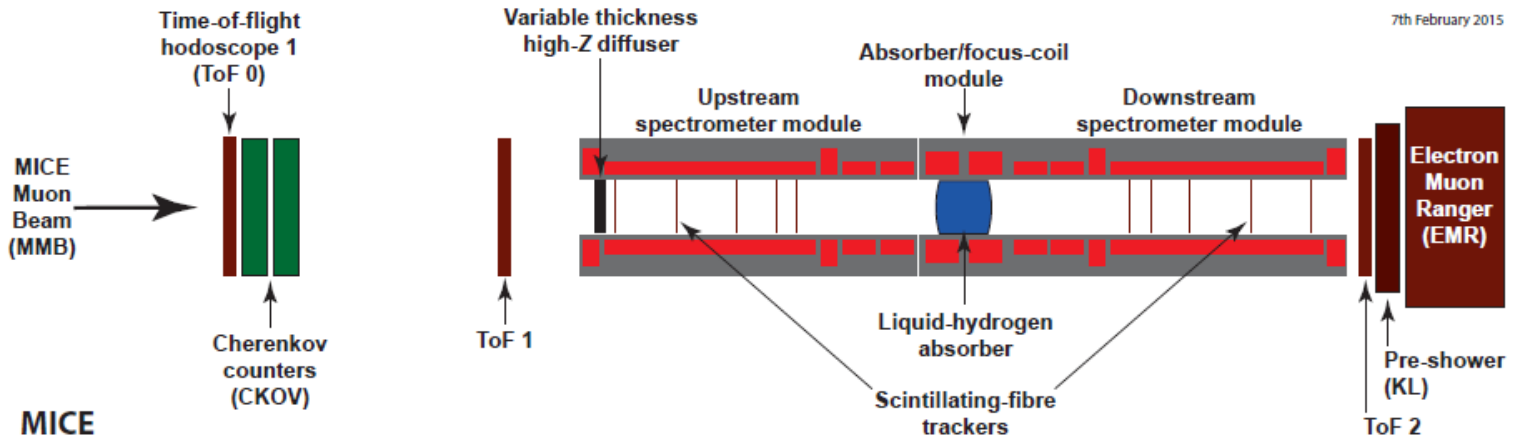
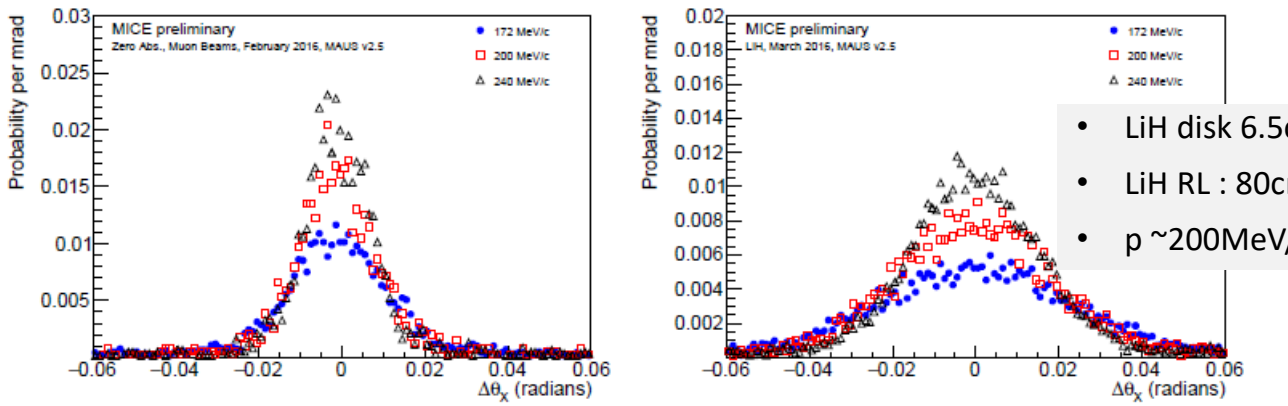


Figure 1: Schematic representation of the as built MICE channel.



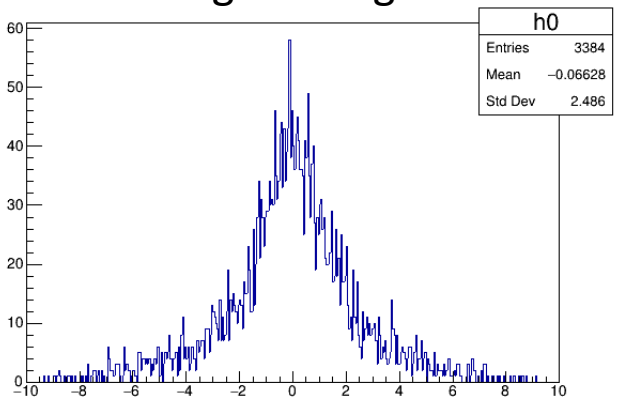
- LiH disk 6.5cm
- LiH RL : 80cm
- p ~200MeV/c

(a) Scattering in channel without absorber. (b) Scattering in channel with LiH Disk.

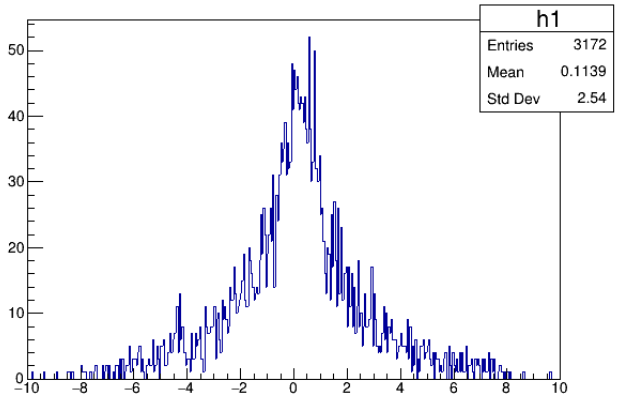
Figure 2: Multiple scattering distributions at the three different nominal beam momenta.

Multiple Scattering

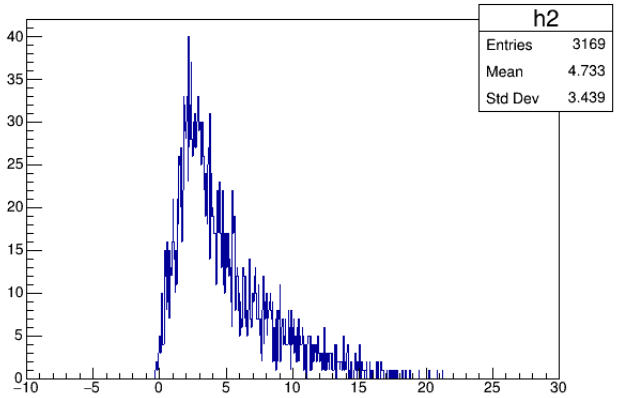
Right -> Right



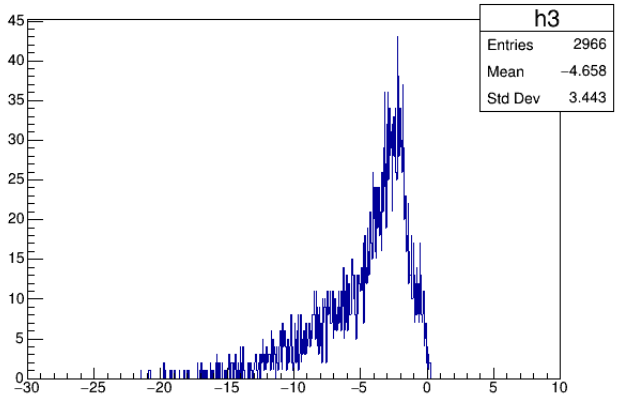
Left -> Left

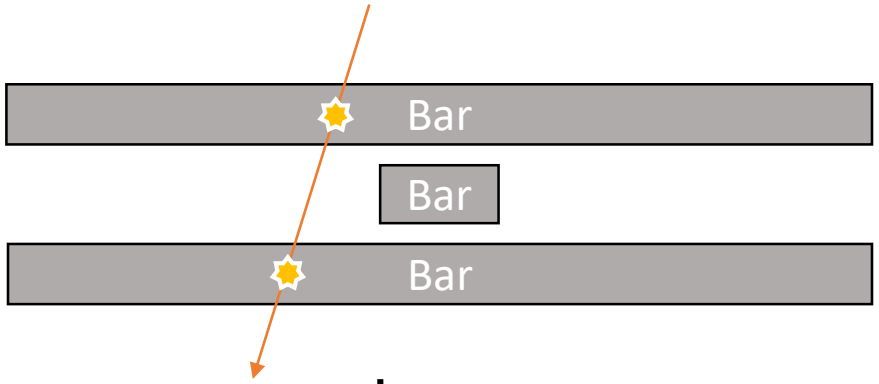


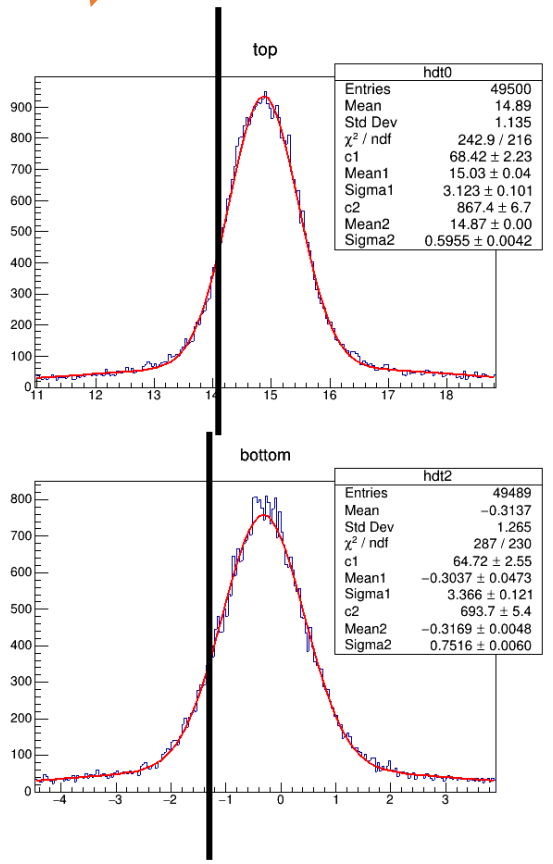
h2



h3







Multiple Scattering