

Sciamatore (o calorimetro) per ACROMASS

DALLA RIUNIONE DEL 17 LUGLIO 2024

Materiale a disposizione

- 16 scintillatori plastici da 8 mm $\rightarrow 0.8/42.54 = 0.0188 X_0$ (0.01 λ_I)
- 16 lastre di rame da 1 mm $\rightarrow 0.1/1.436 = 0.0696 X_0$ (0.0065 λ_I)
- 16 lastre di Tungsteno da 1.6 mm $\rightarrow 0.16/0.3504 = 0.457 X_0$ (0.016 λ_I)
- 12 lastre di piombo da 6 mm $\rightarrow 0.6/0.5612 = 1.069 X_0$ (0.034 λ_I)

Scopo dello sciamatore in ordine di priorità

- *separare muoni e elettroni a bassa energia (fino a 100 MeV/c)*
- *separare muoni e protoni a alta energia (da ~ 1 GeV/c)*

Scopo del lavoro: ottimizzare la configurazione geometrica

Tempi: ad autunno

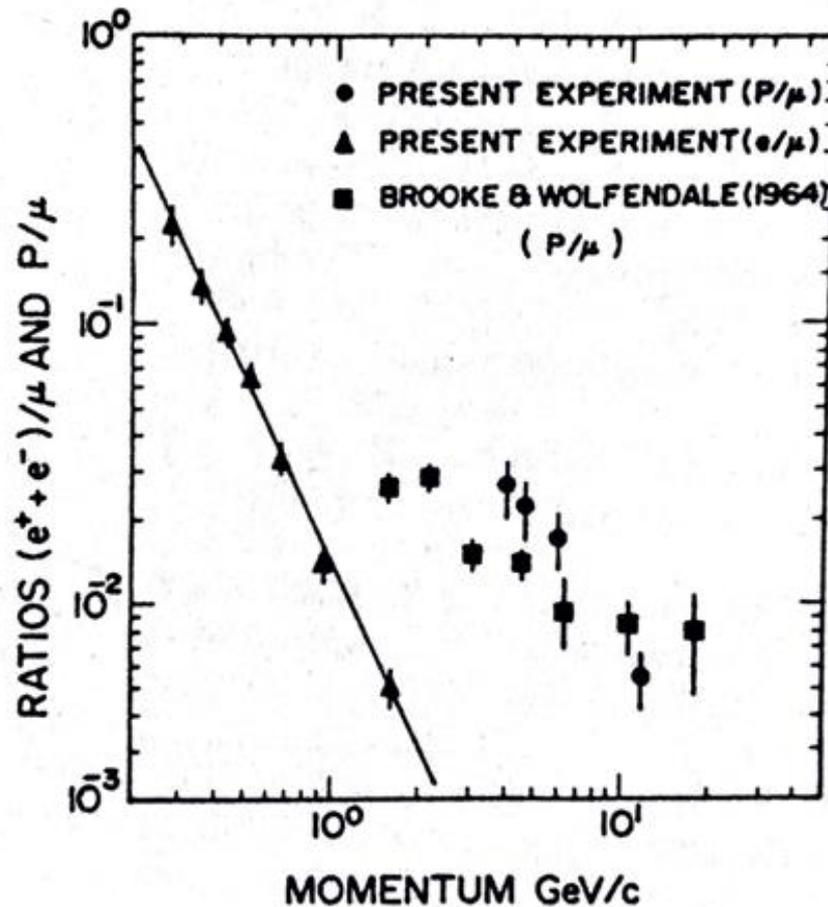
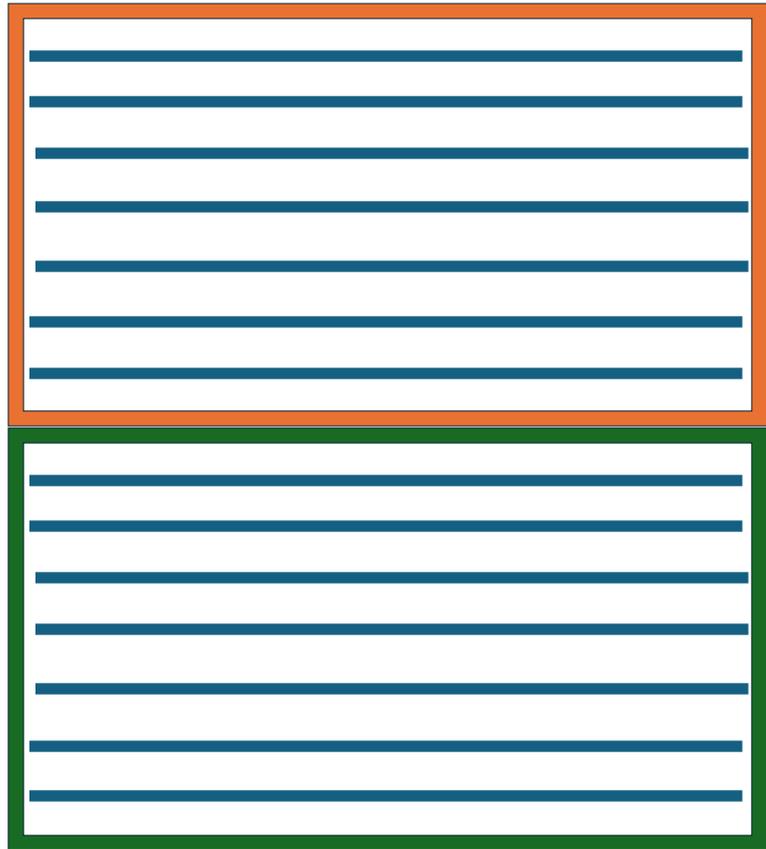


Figure 7. The ratios of electrons to muons and protons to muons plotted as a function of momentum. The ratios from other experiments are corrected for the attenuation from sea level to 945 g/cm².

Idea di base



Sciamatore leggero:
Scintillatore + Rame

*Ottimizzato per la
separazione
muoni/elettroni*

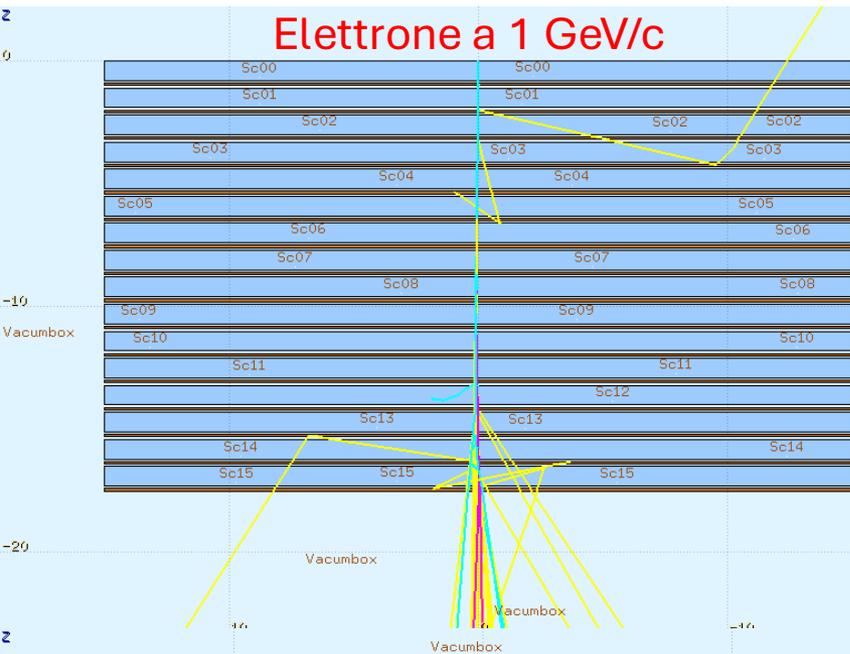
Sciamatore pesante:
Scintillatore + Tungsteno
+ Piombo

*Ottimizzato per la
separazione
muoni/protoni*

Bisogna trovare il miglior compromesso col materiale a disposizione

Configurazione con 16 scintillatori alternati a 16 lastre di rame

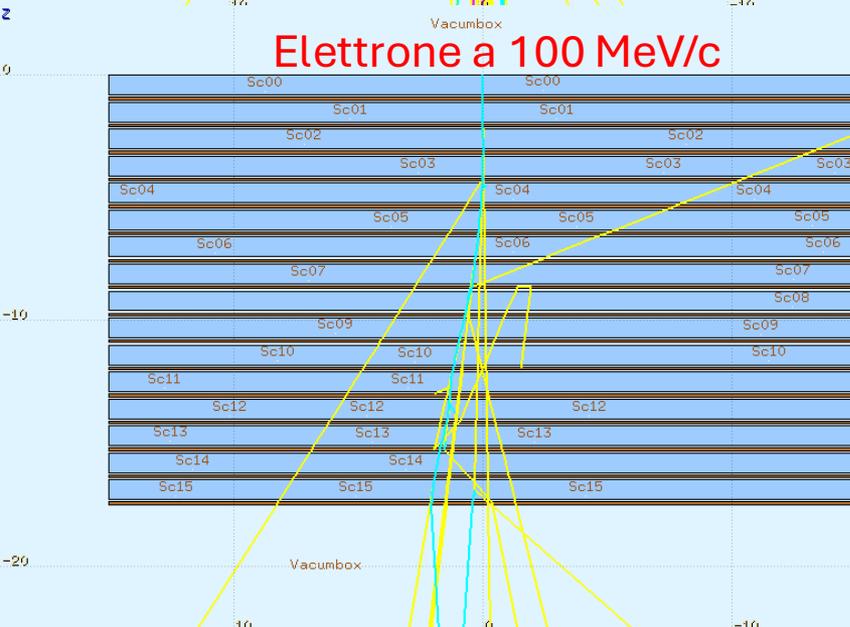
Elettrone a 1 GeV/c



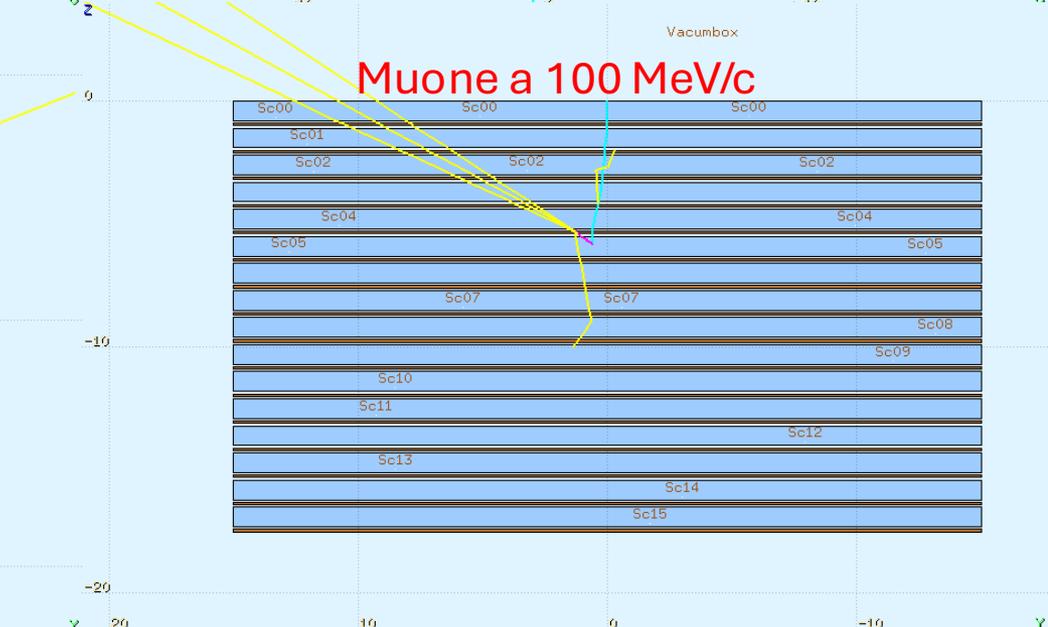
Muone a 1 GeV/c



Elettrone a 100 MeV/c

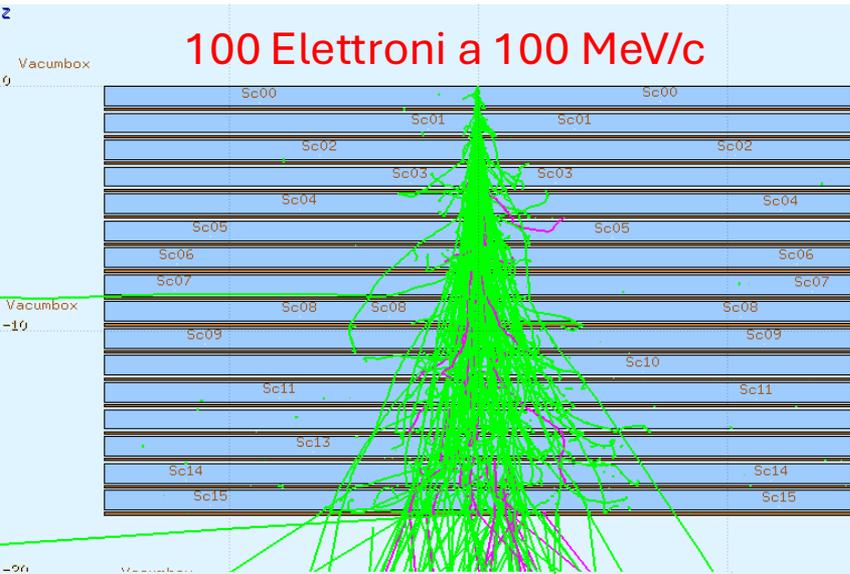


Muone a 100 MeV/c

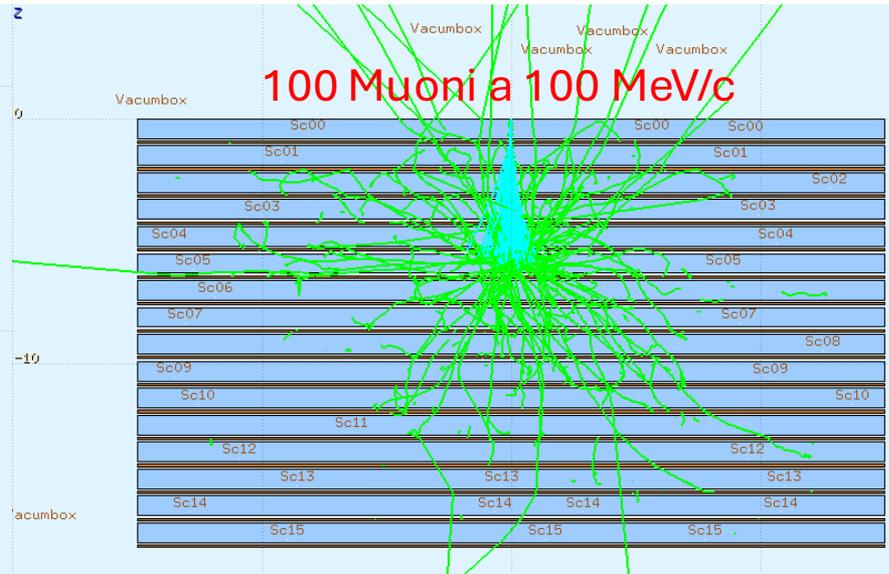


Identificare muoni ed elettroni dal profilo dei segnali

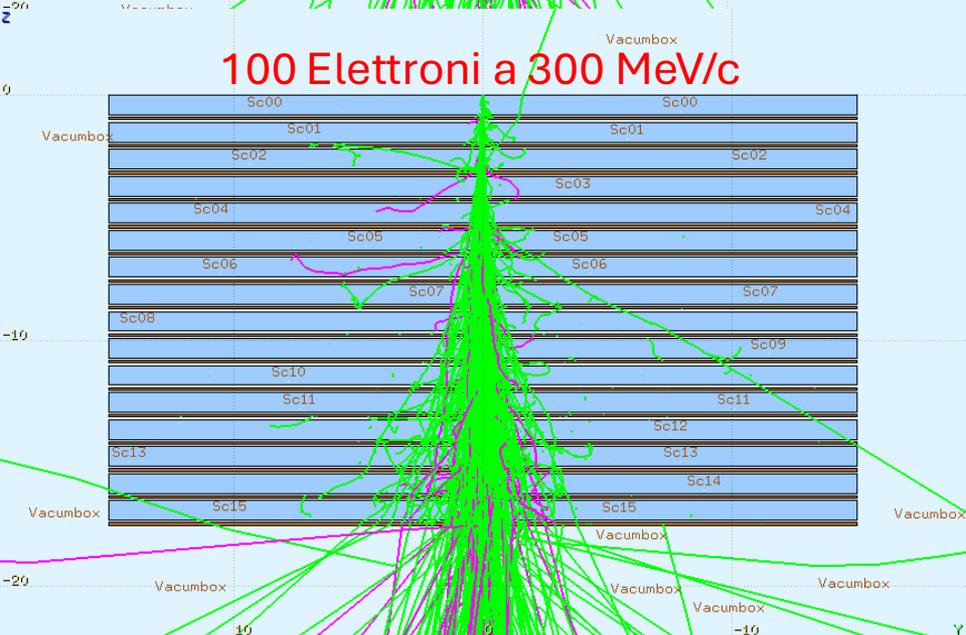
100 Elettroni a 100 MeV/c



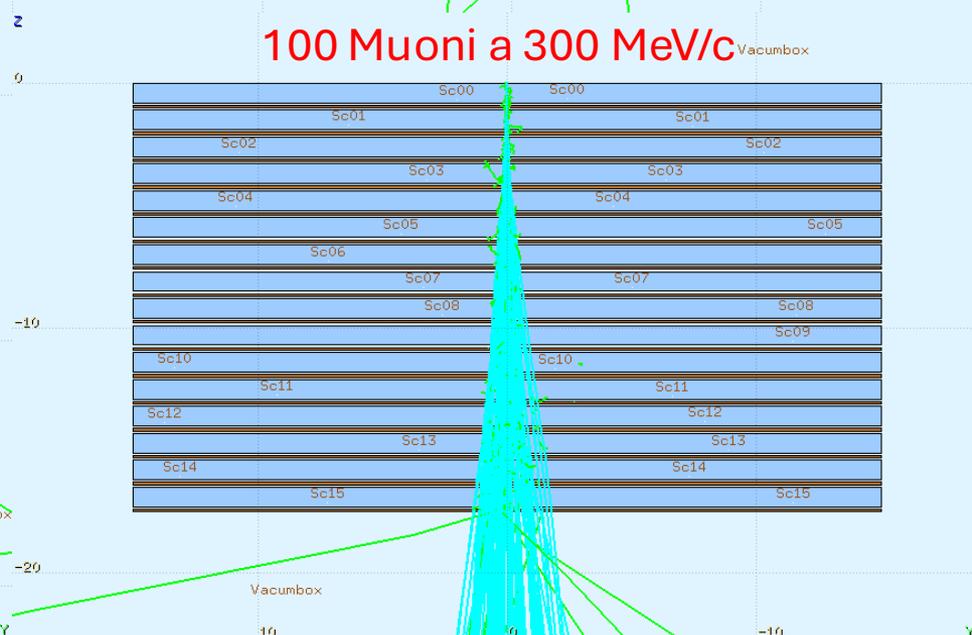
100 Muoni a 100 MeV/c



100 Elettroni a 300 MeV/c

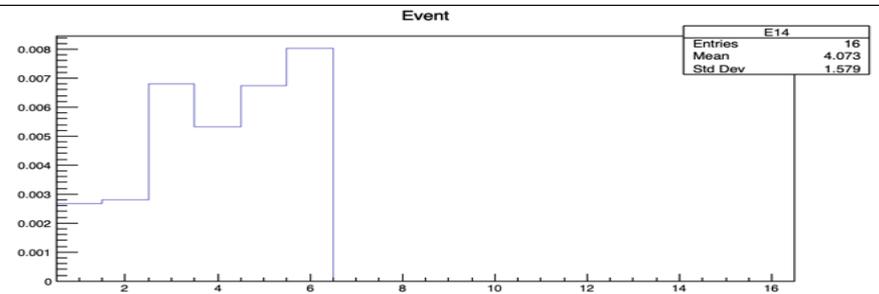
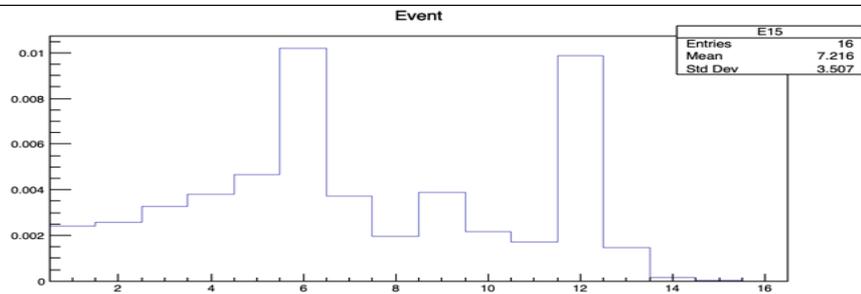
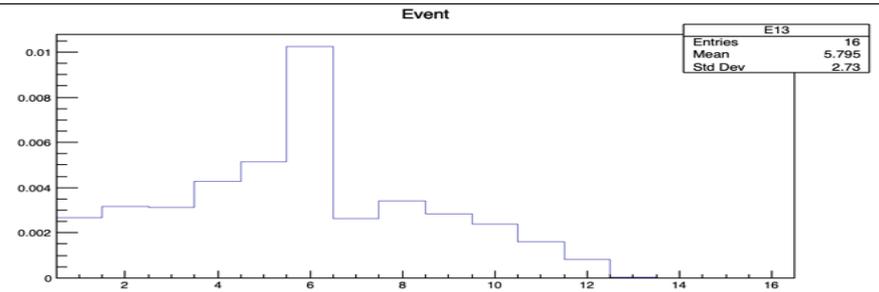
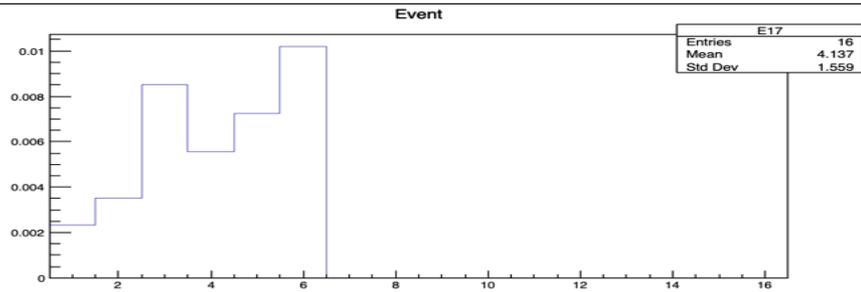
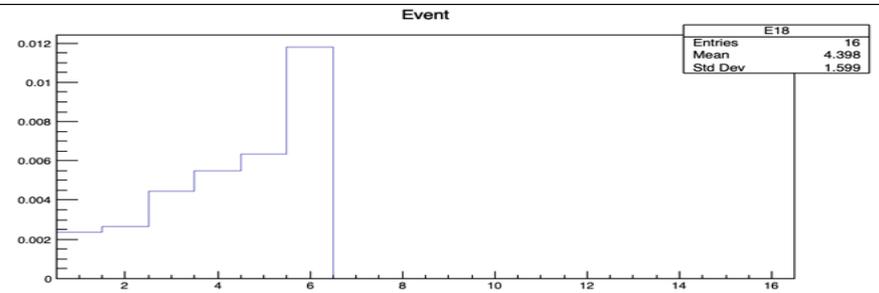
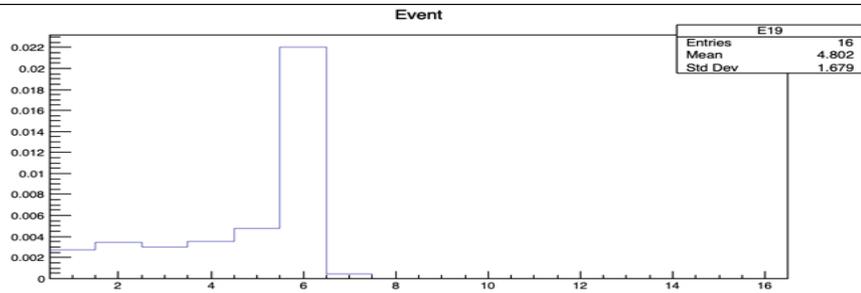
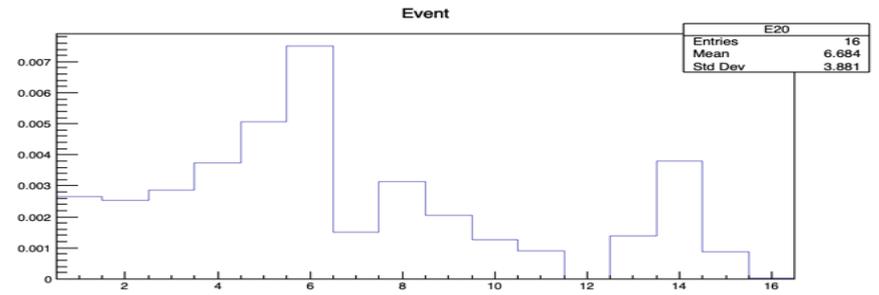
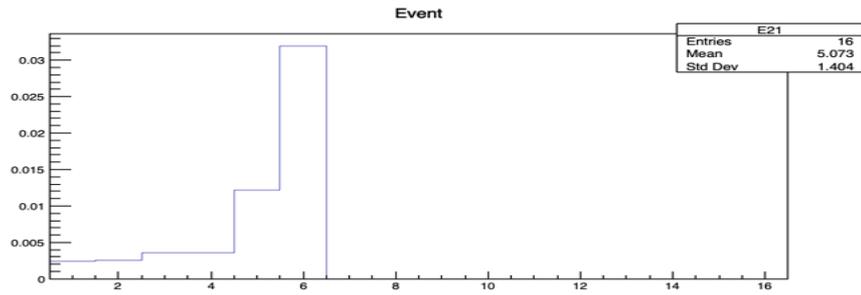


100 Muoni a 300 MeV/c

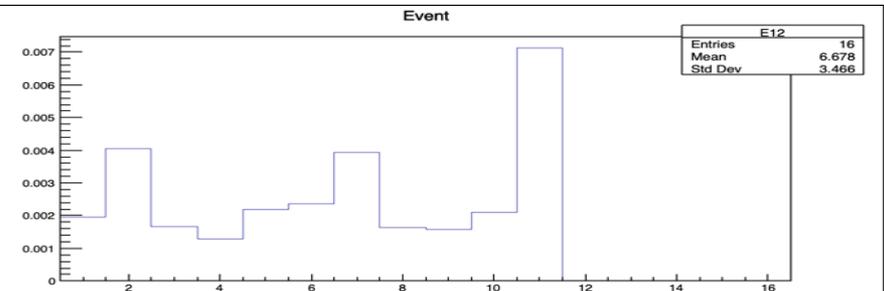
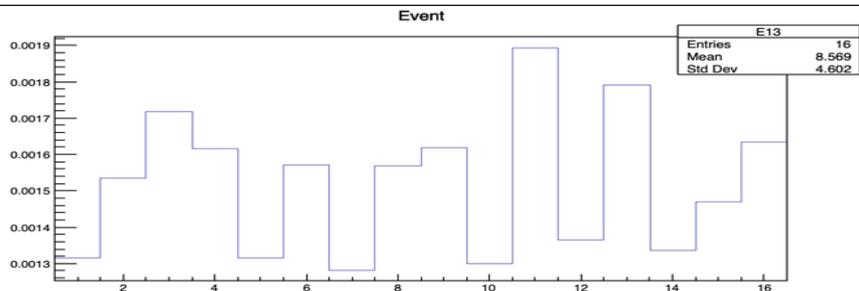
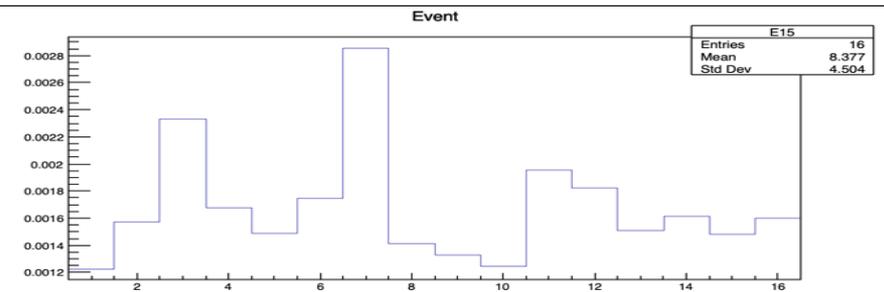
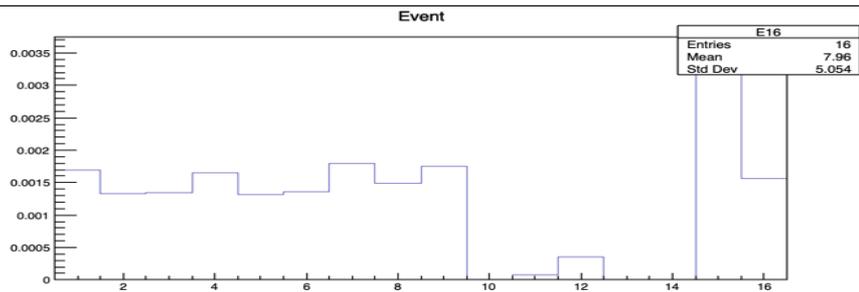
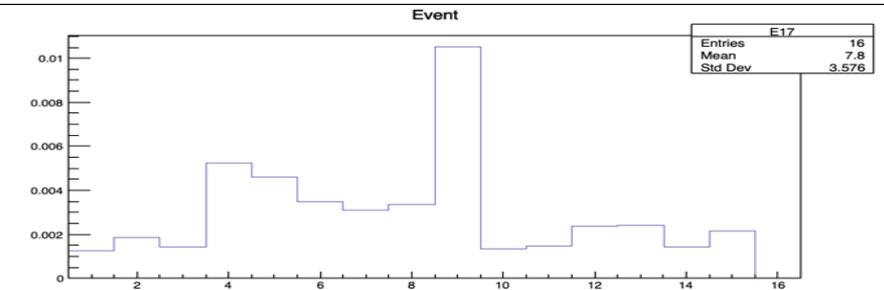
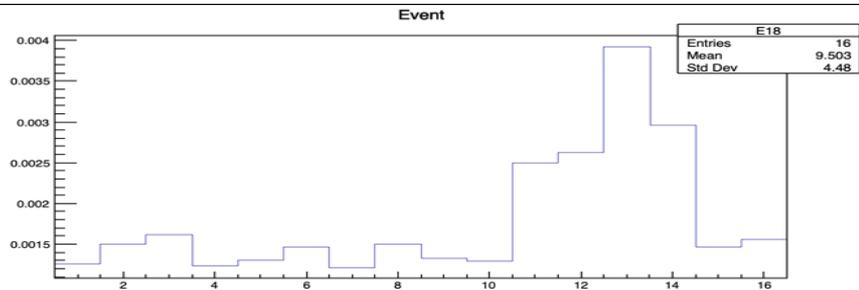
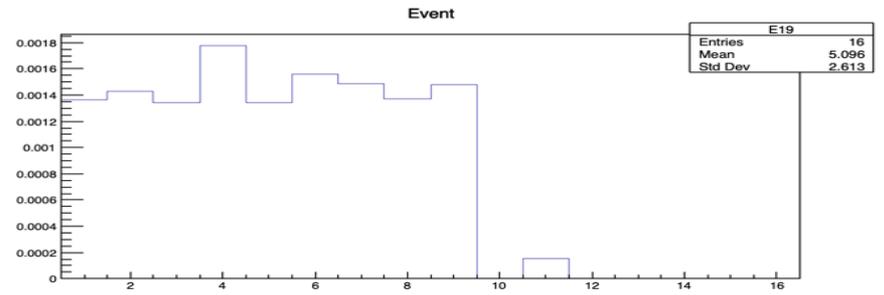
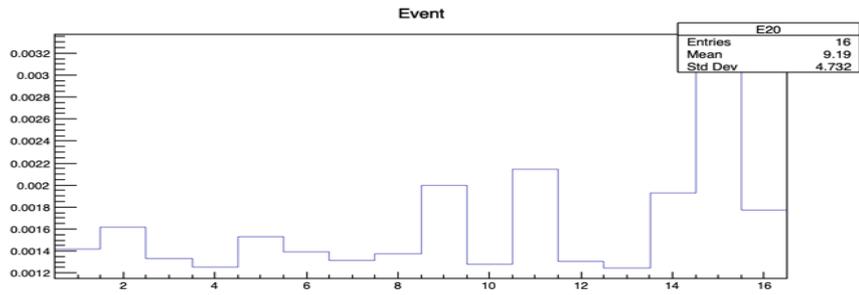


1. Trovare un buon algoritmo di identificazione a bassa energia
2. Minimizzare il numero di piani necessari

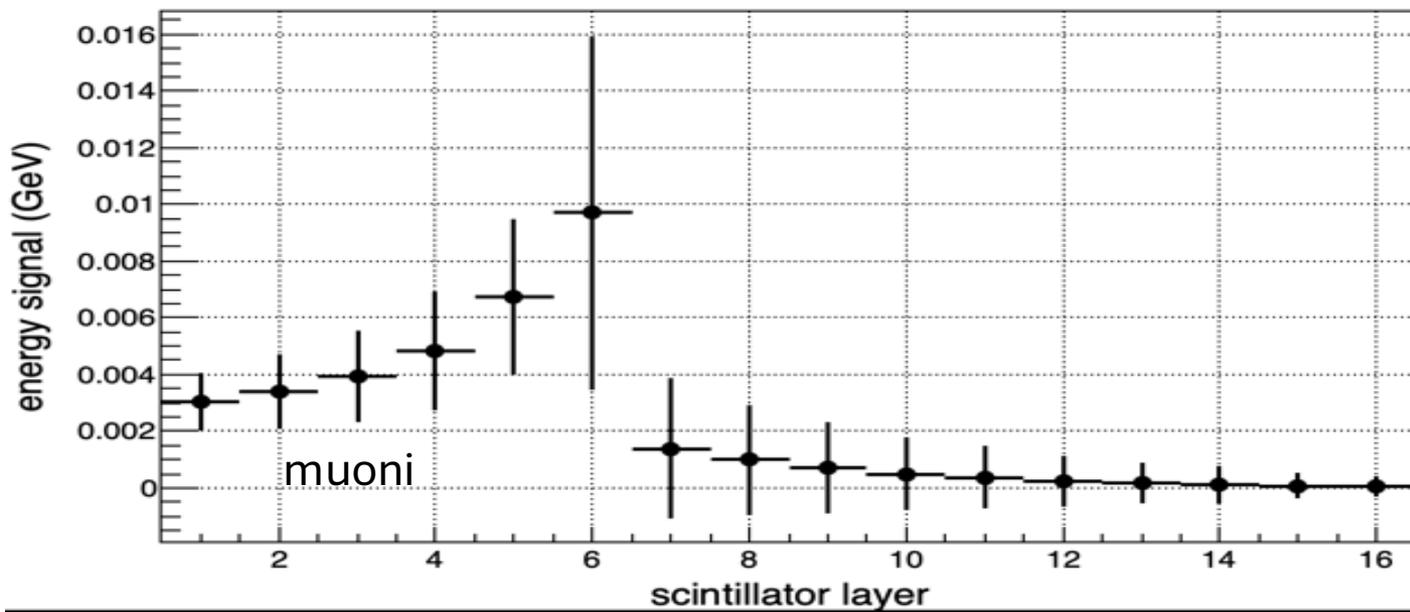
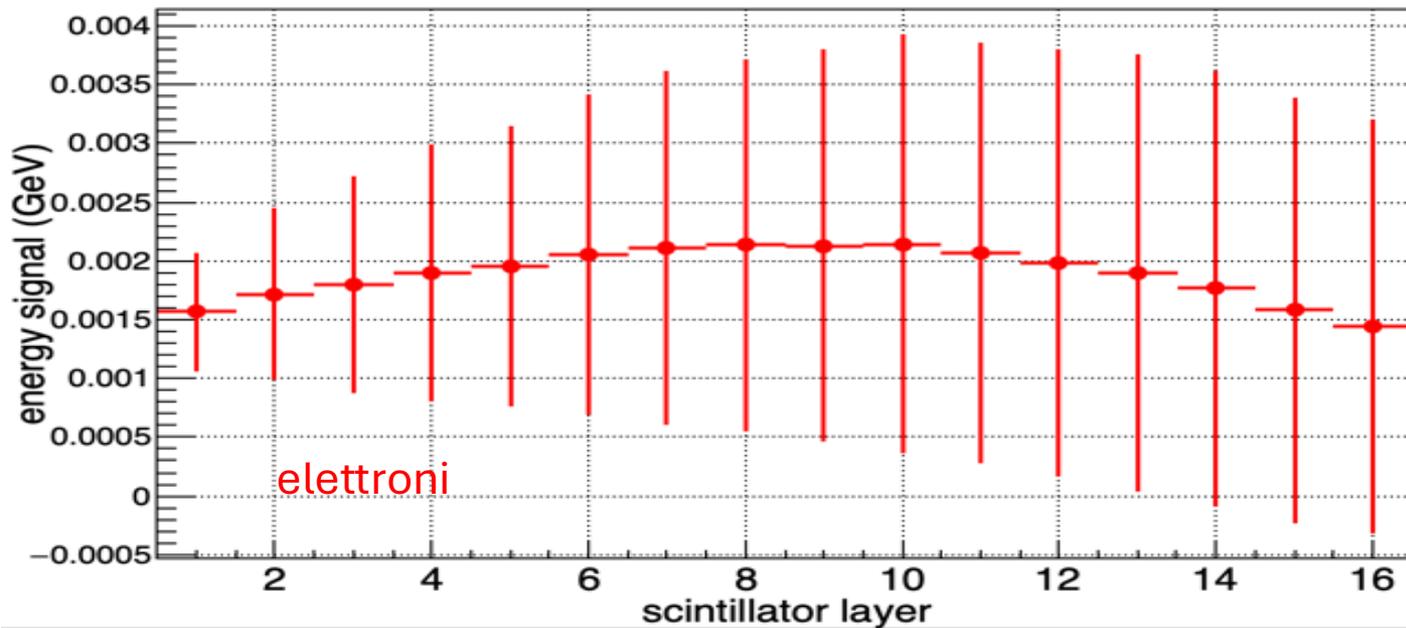
Profilo dei segnali per muoni a 100 MeV/c



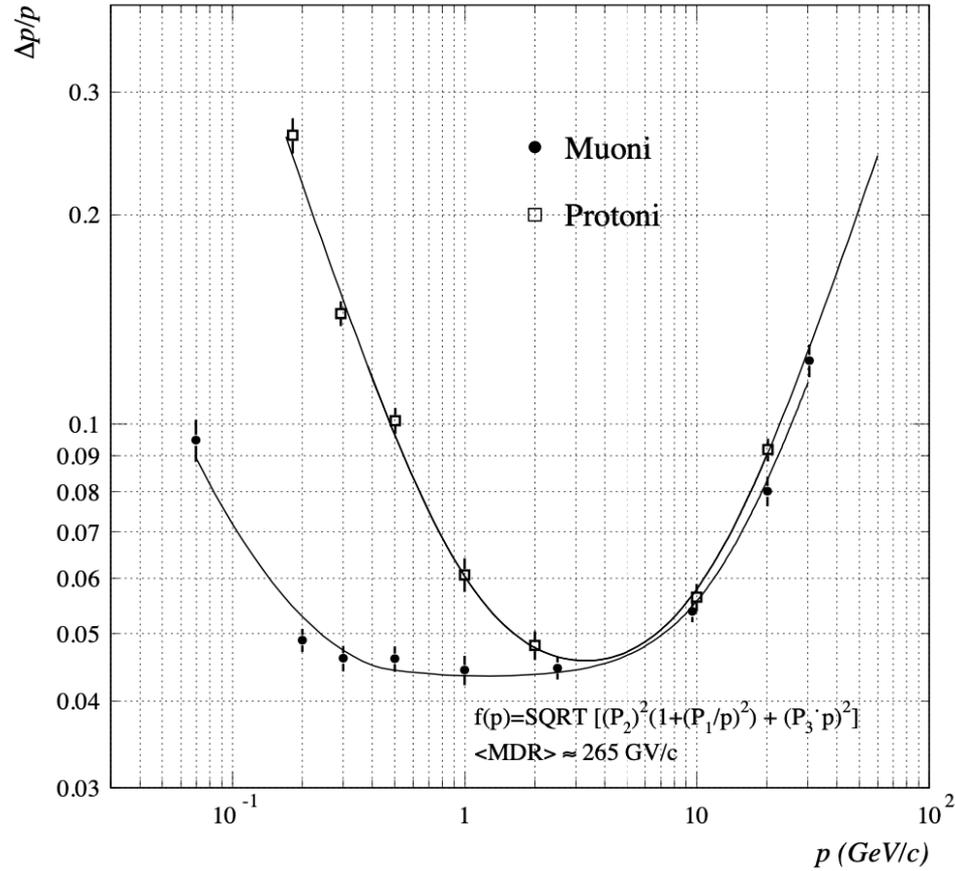
Profilo dei segnali per elettroni a 100 MeV/c



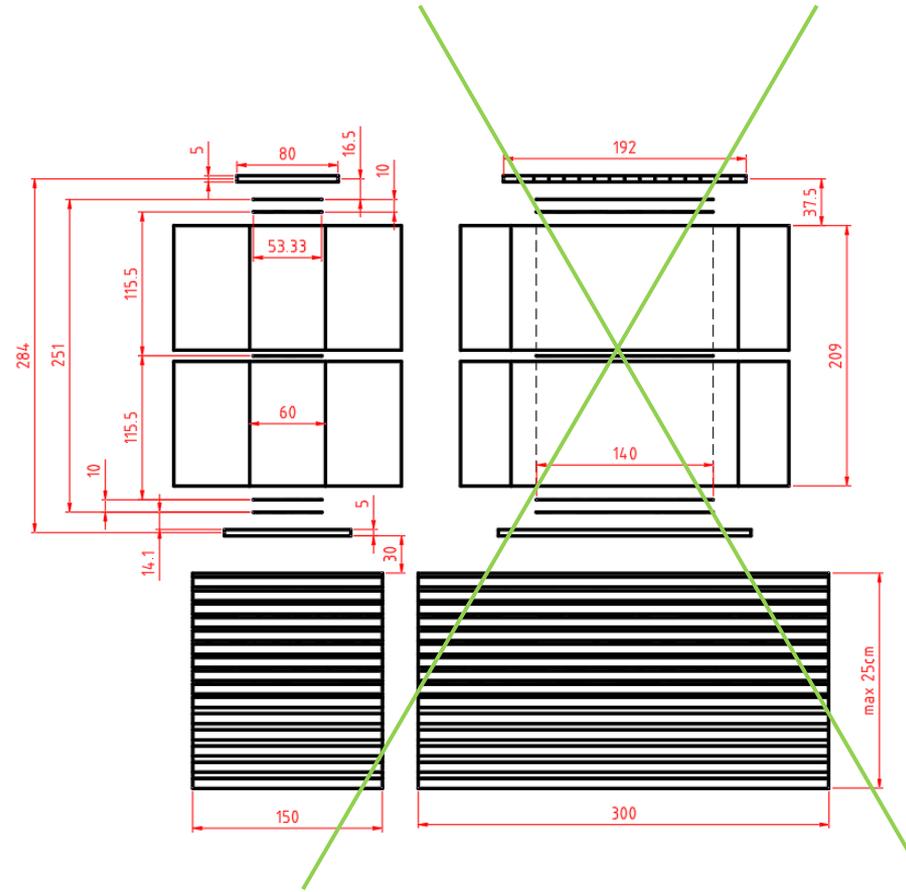
Profili medi dei segnali e varianza a 100 MeV/c



Due fattori da tenere in conto



Risoluzione in impulso dello spettrometro



Apertura angolare