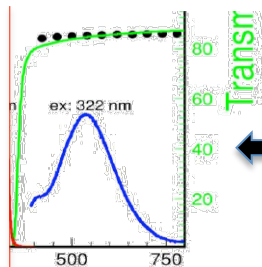
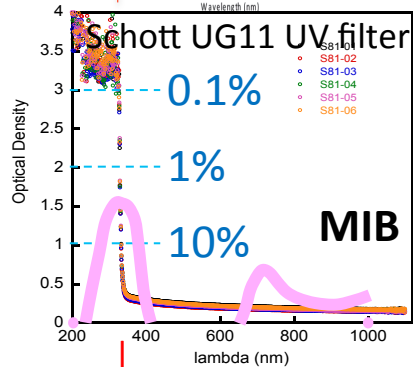
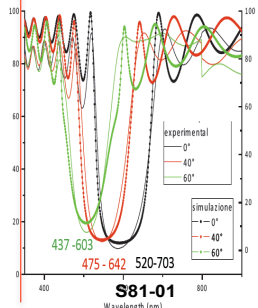
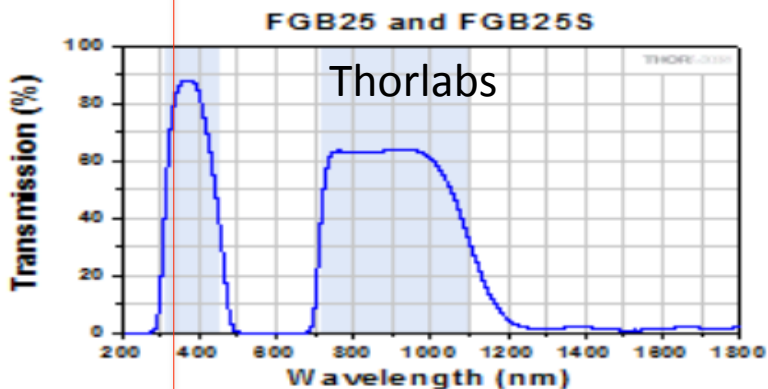


Cherenkov in CsI(Tl) e BaF₂

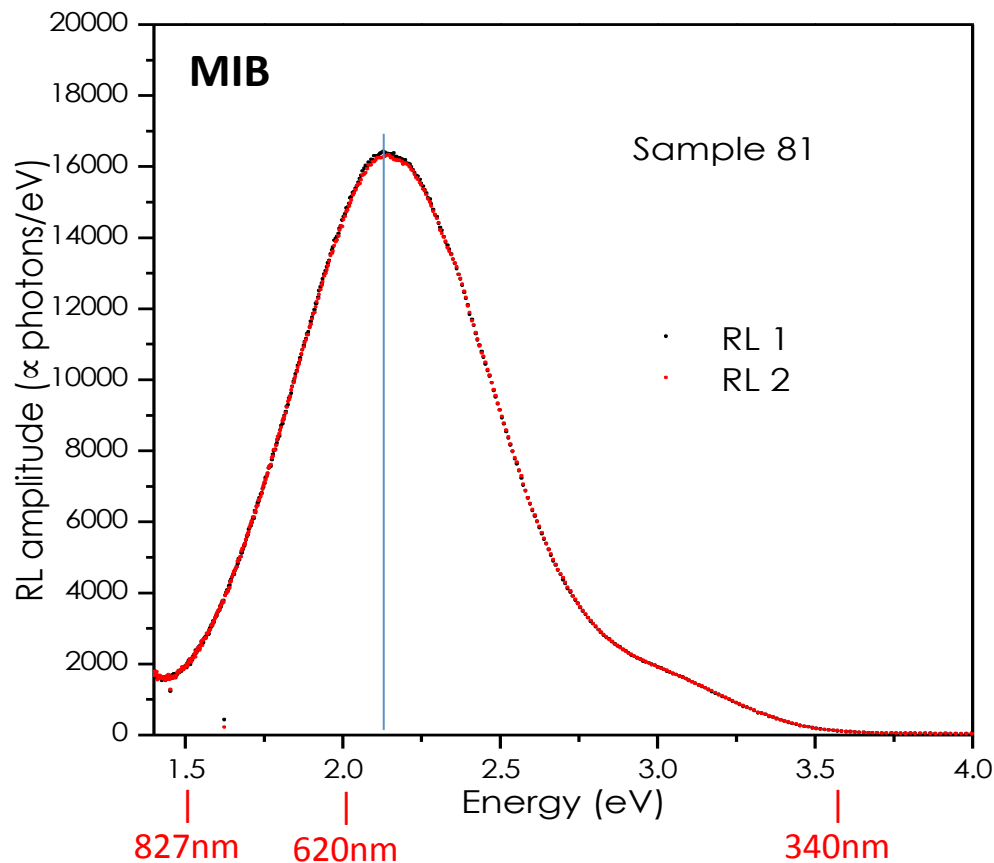
S.Albergo,
per Catania/Messina



CsI Emission & Transmission



340nm



Scintillation 57 phontn/KeV

→ Photon yield

Cherenkov:

$$\frac{dN}{dx} = 2\pi\alpha z^2 \int_{\lambda_1}^{\lambda_2} \left(1 - \frac{1}{n^2(\lambda)\beta^2}\right) \frac{d\lambda}{\lambda^2} \approx 2\pi\alpha z^2 \sin^2\theta_c \frac{\lambda_2 - \lambda_1}{\lambda_2\lambda_1} = 490 \sin^2\theta_c [cm^{-1}] \quad 400 - 700 \text{ nm}$$

1150 $\sin^2\theta_c [cm^{-1}]$ incl. UV 200-700nm

blue!

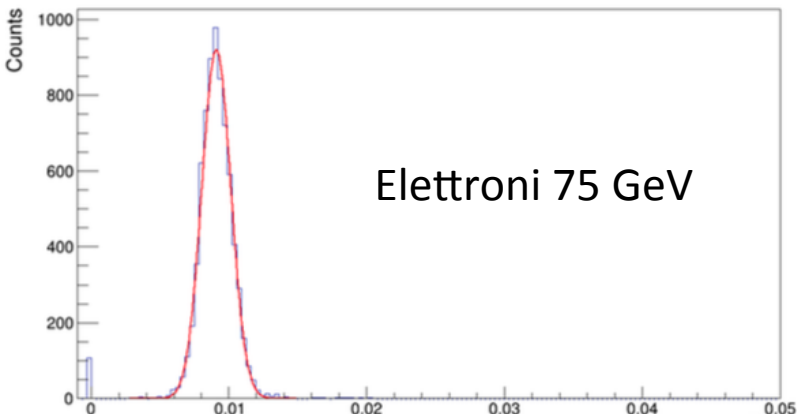
← Cosmic Rays



Filtro	
No	$1.26 \cdot 10^{-2}$
Dicroico	$1.44 \cdot 10^{-2}$
Cromatico	$2.34 \cdot 10^{-2}$

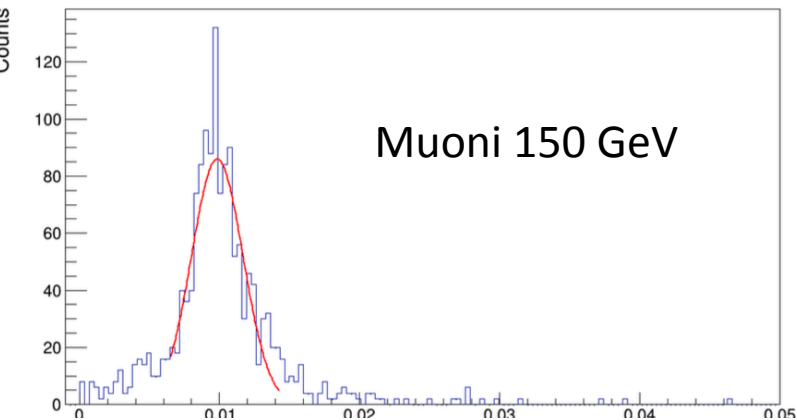
Configurazione	R_{Cs}
A1	$2.99 \cdot 10^{-3} \pm 4.76 \cdot 10^{-6}$
B1	$9.09 \cdot 10^{-3} \pm 1.23 \cdot 10^{-5}$
C1	$6.67 \cdot 10^{-3} \pm 7.87 \cdot 10^{-6}$

CsI+Filtro Thorlabs



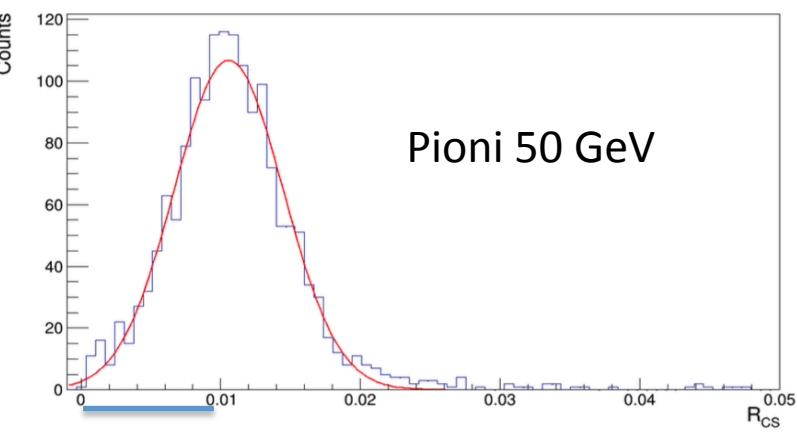
Elettroni 75 GeV

$$R_{CS} = 0,91 \cdot 10^{-2} \quad \sigma_R/R = 0.10$$



Muoni 150 GeV

$$R_{CS} = 0,99 \cdot 10^{-2} \quad \sigma_R/R = 0.20$$

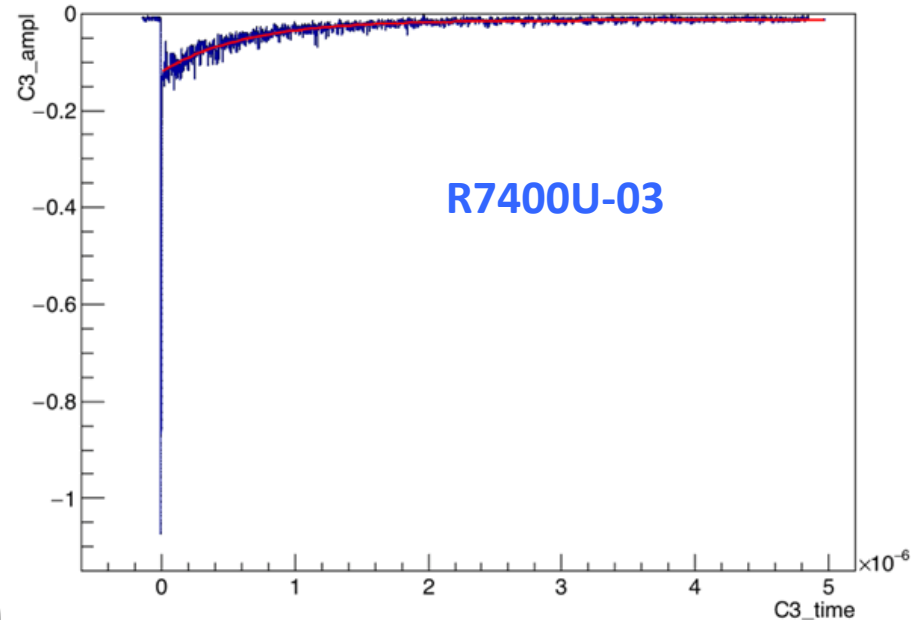
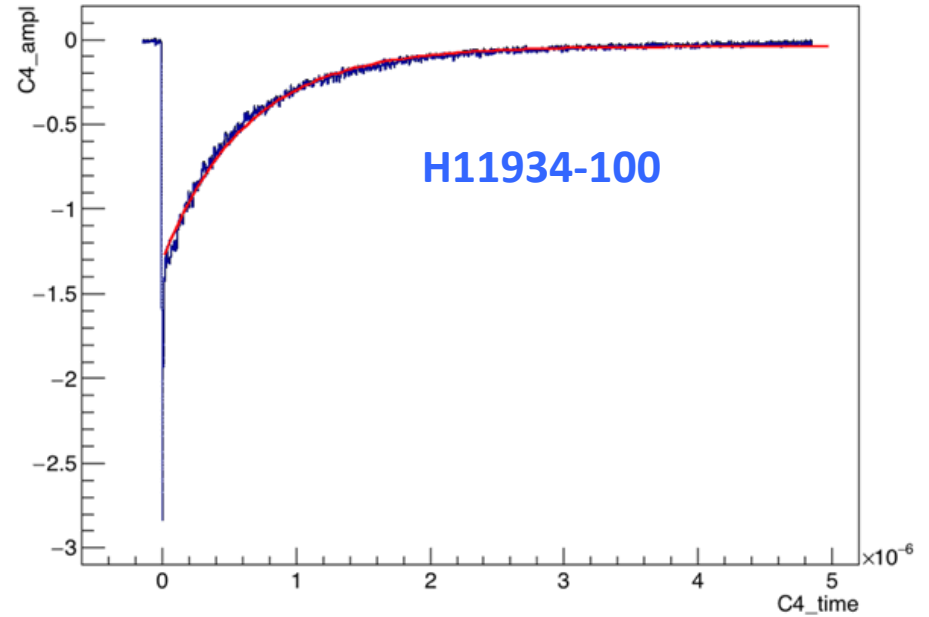
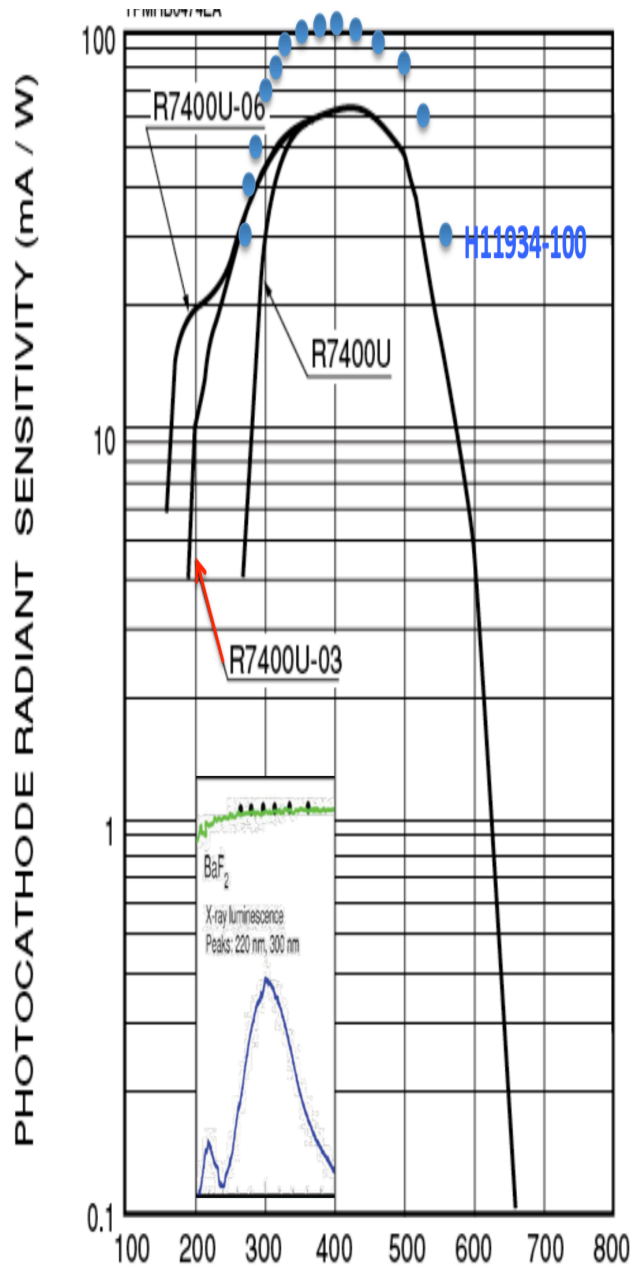


Pioni 50 GeV

$$R_{CS} = 1,06 \cdot 10^{-2} \quad \sigma_R/R = 0.40$$

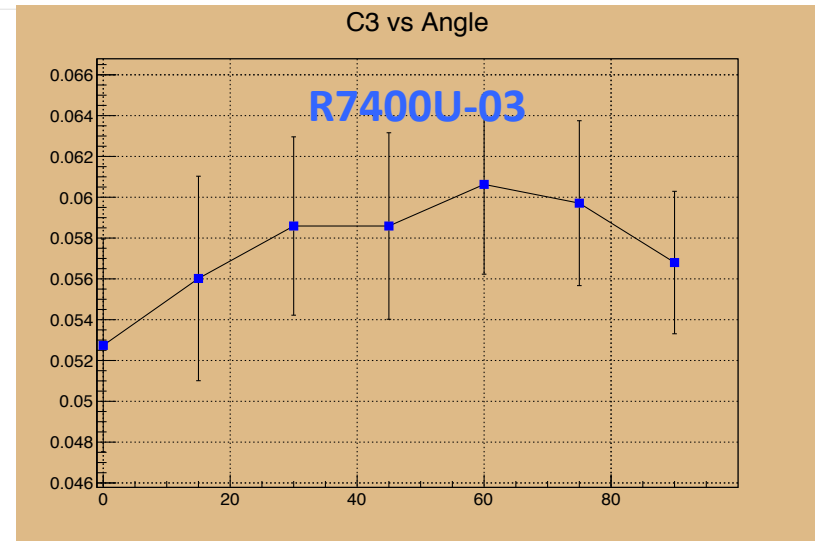
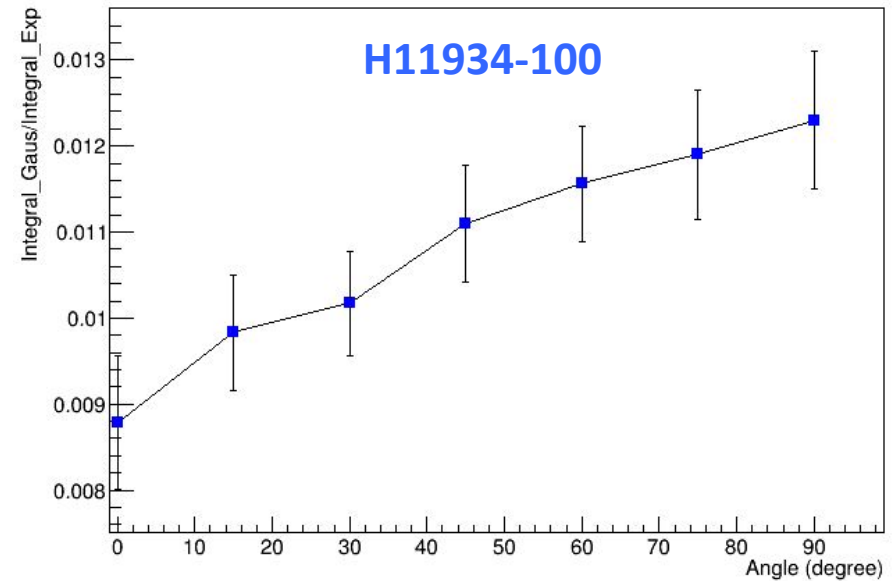
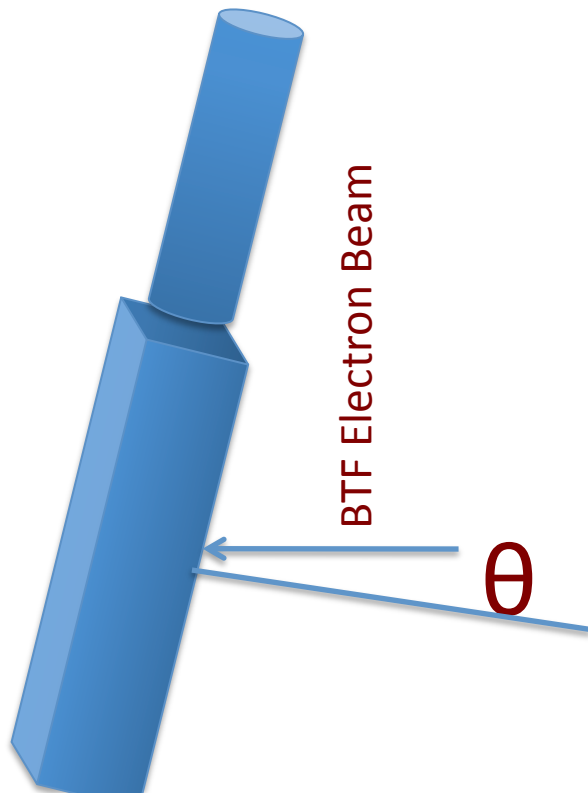
BTF test of BaF₂

25 cm

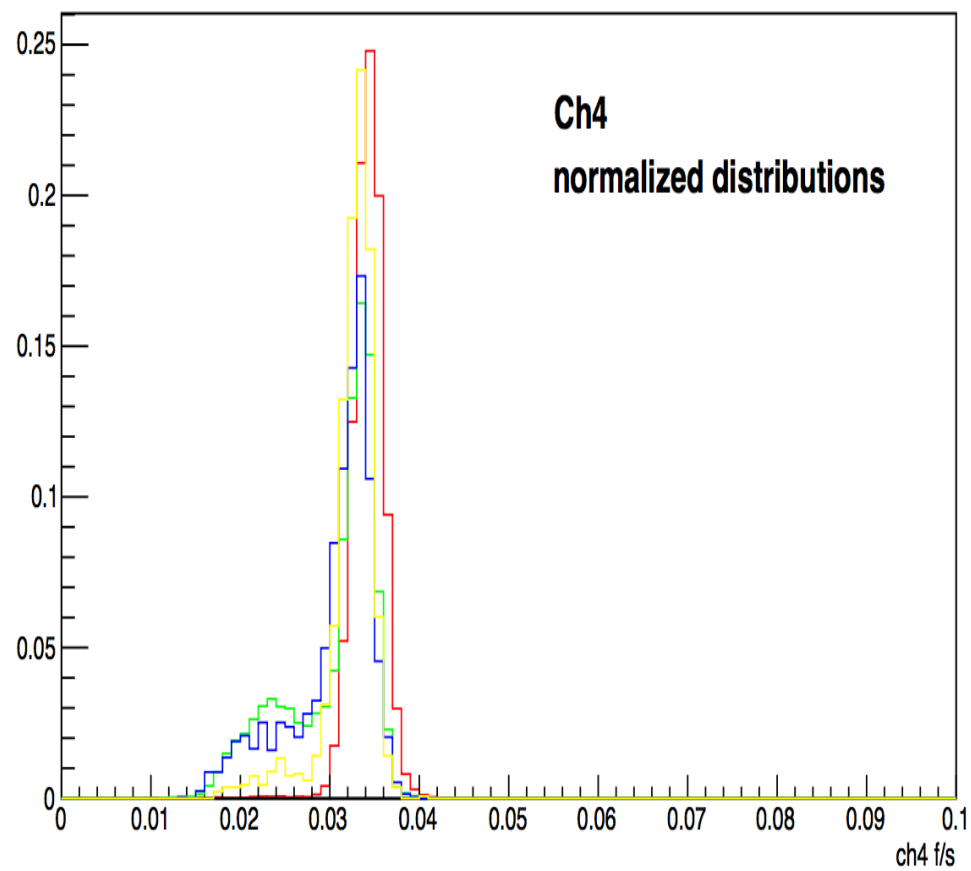
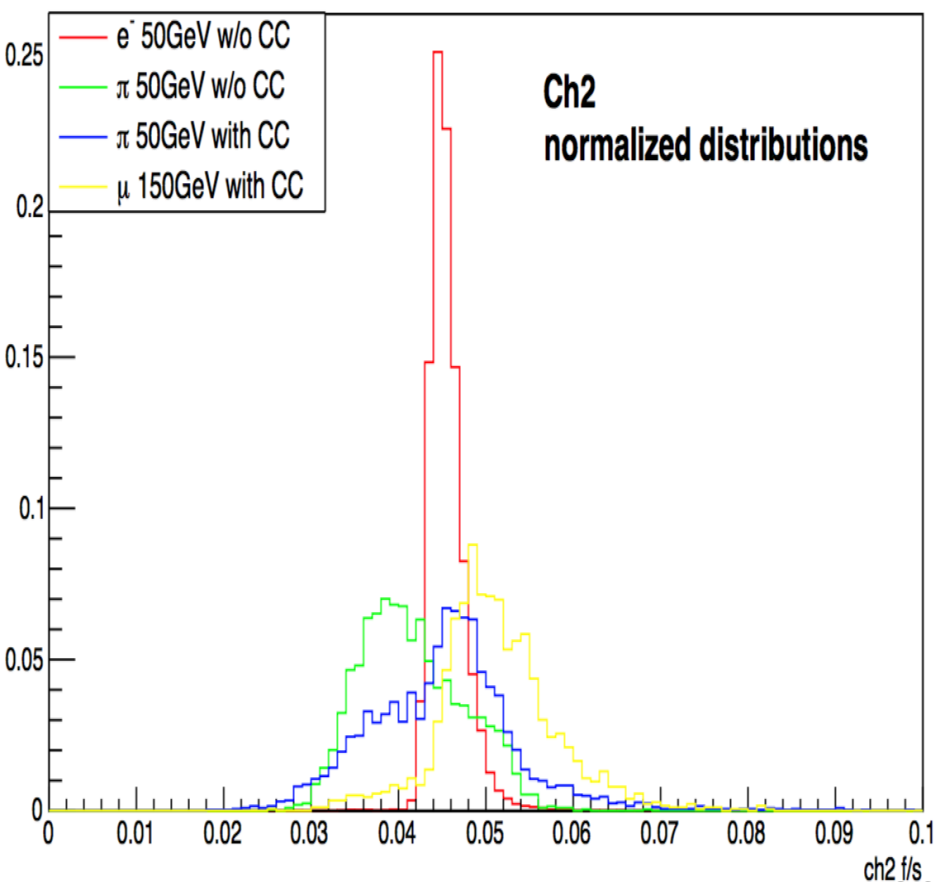
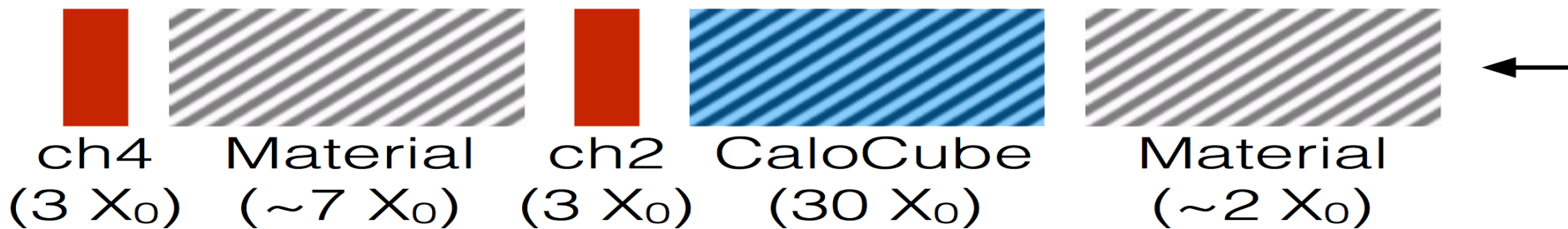


Cherenkov/Scintillation VS θ in BaF

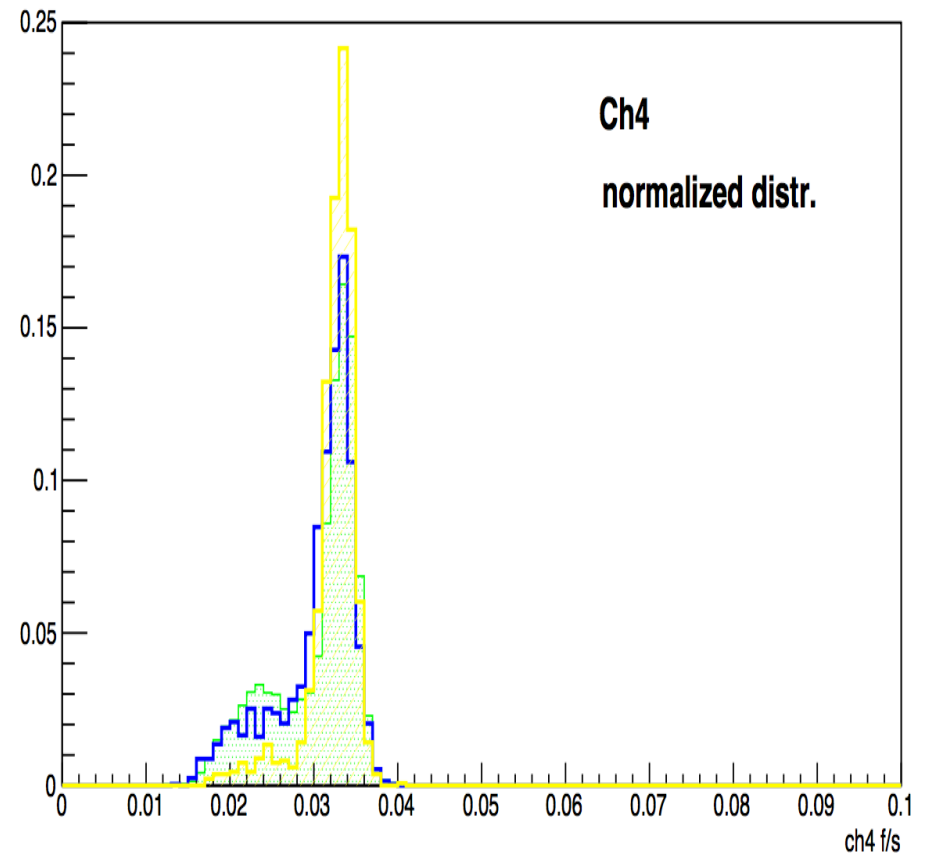
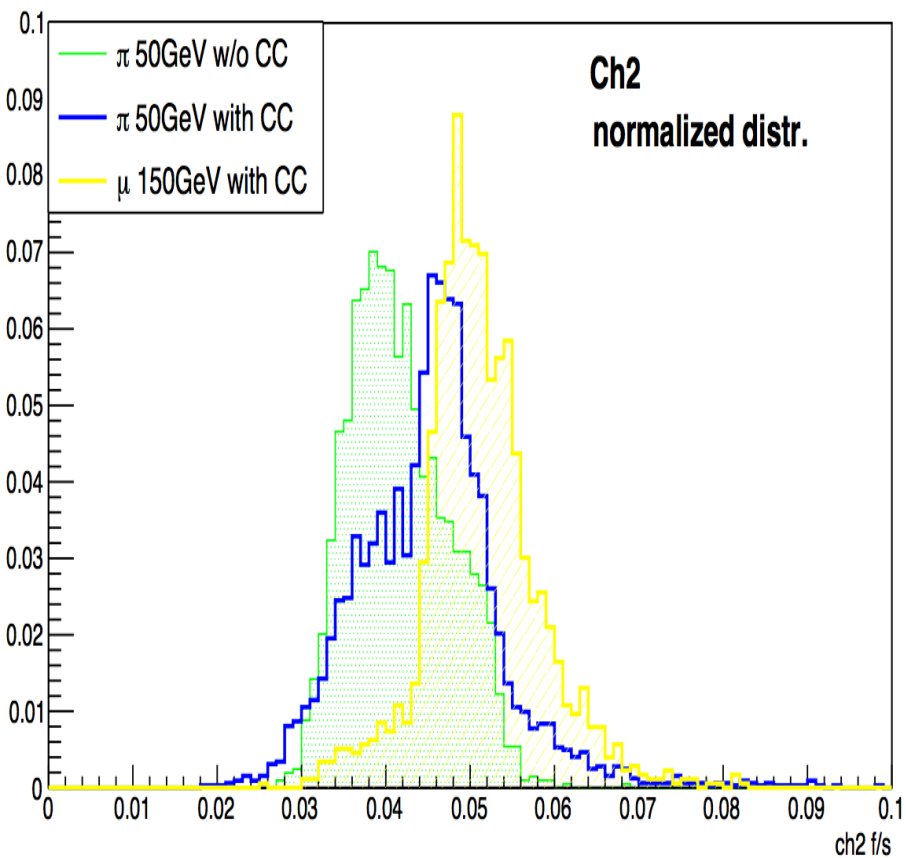
Fast/Slow



$R_{\text{fast-slow}}$ in BaF2



$R_{\text{fast-slow}}$ in BaF2



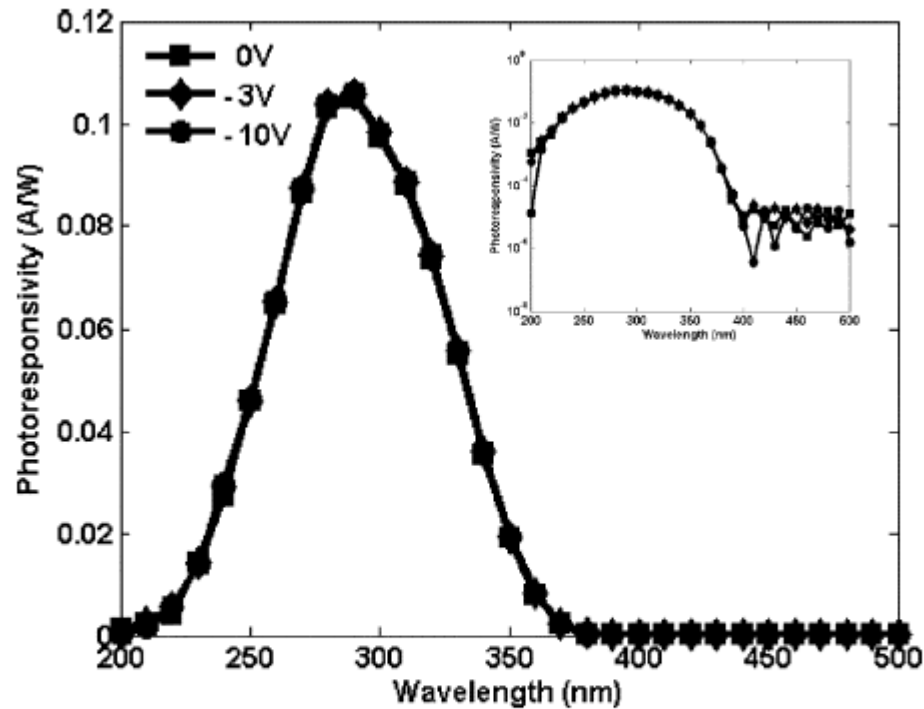
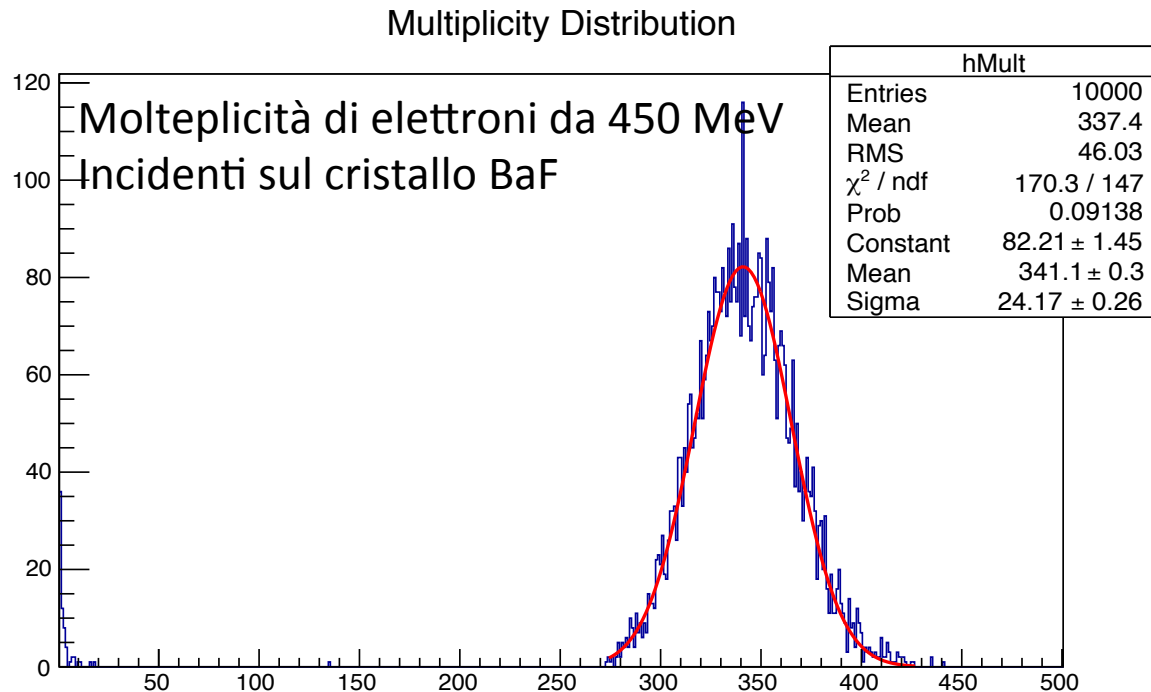
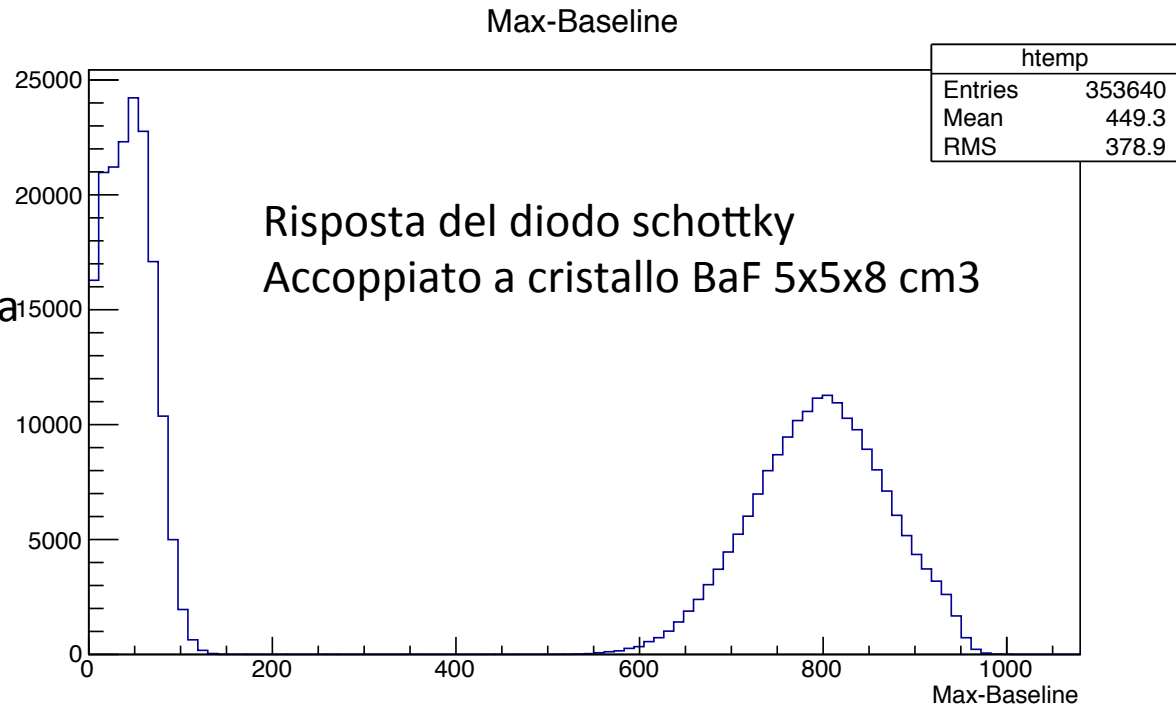
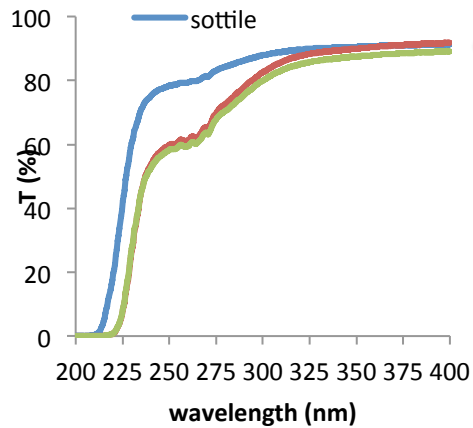


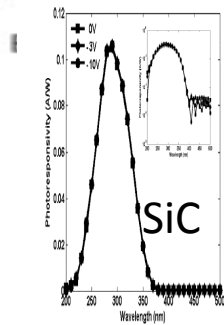
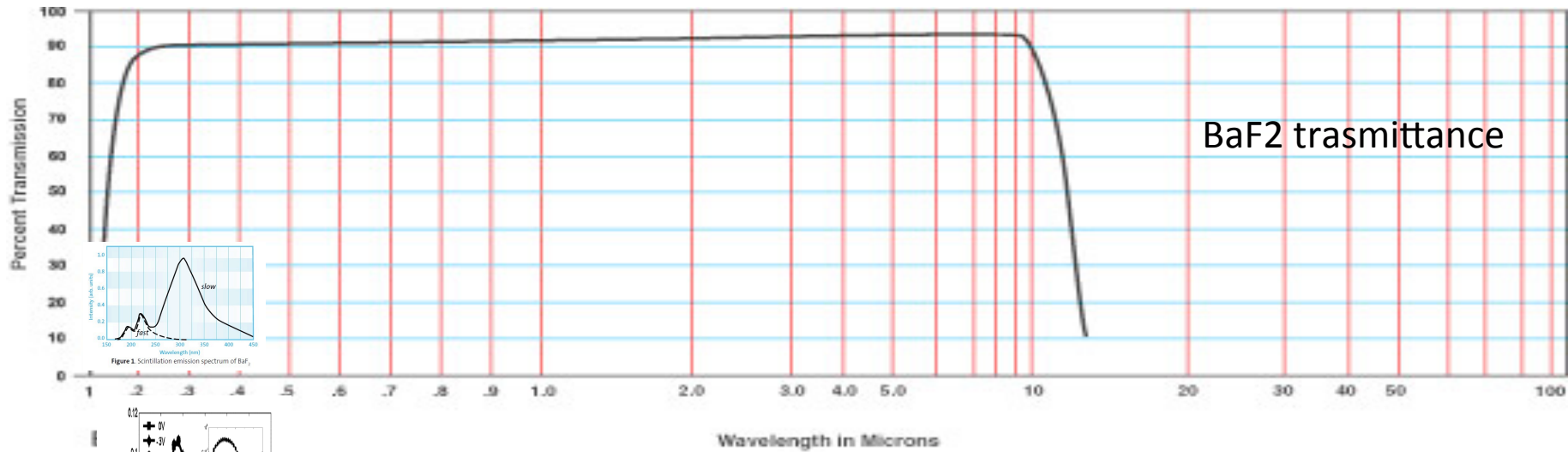
Fig. 5. Photoresponsivity curves at 25 °C as a function of the reverse bias applied. The maximum photon detection efficiency is already attained at 0 V in the wavelength range 200–380 nm. In the inset, the curves are reported in a semilogarithmic plot.

Schottky device 10.x10. mm² A.Sciuto

Incremento della sensibilità:

- Matrice di 4 diodi
- Accoppiamento ottico con resina





Proposta:

Inserire in calocube una decina di cristalli BaF2 letti da:

- matrice di sic per leggere scintillazione
- Fotodiodo in Si con filtro UV il cherenkov

Fig. 5. Photoreactivity α

