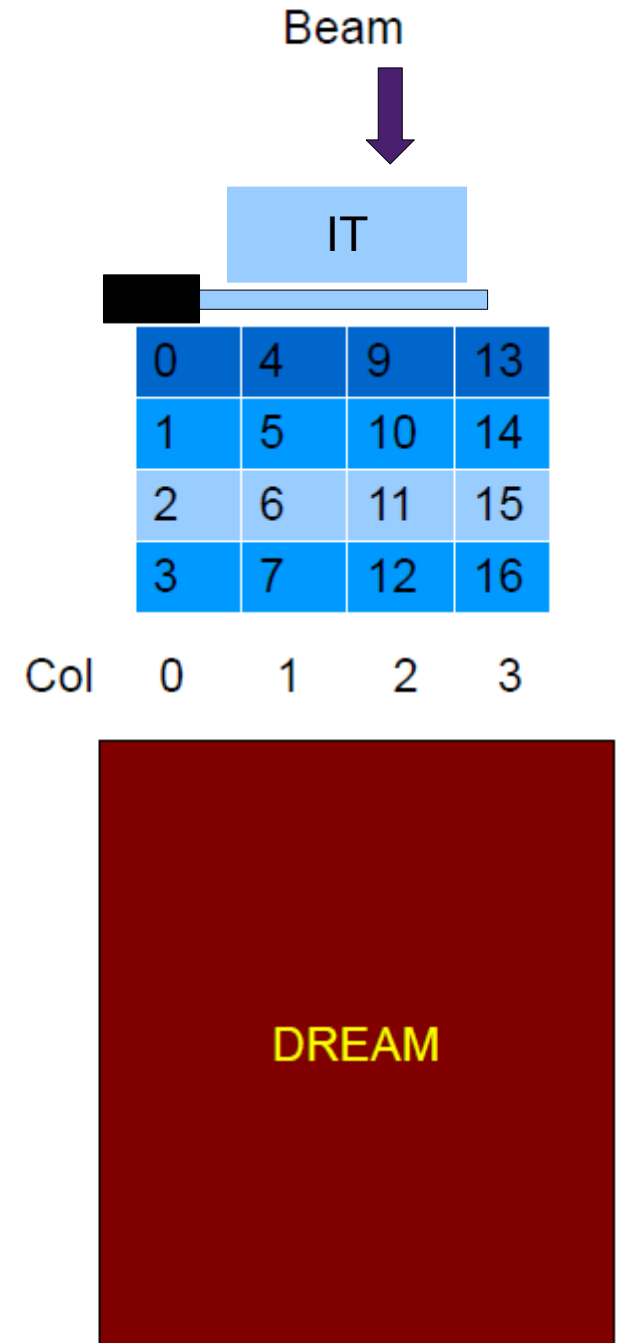


# Set-up

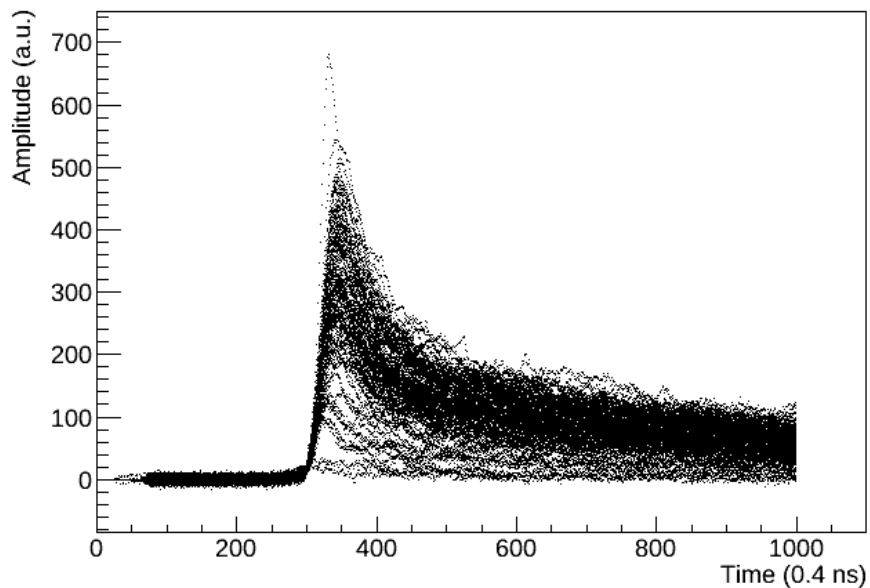
- 100 BGO xtals readout by 16 PMTs equipped with UG11 filters;
- Waveforms acquired by 16 DRS channels with 2.5 Gs/s
- The beam was centered on column 2;
- In front of the matrix there was the interaction target to produce pseudo-jets;
- Downstream the IT there was a scintillator readout by a PMT to measure the multiplicity of the pseudo-jet;
- DREAM was sitting downstream of the matrix;
- The results obtained are compared with the ones published on NIMA 610(2009)488–501.



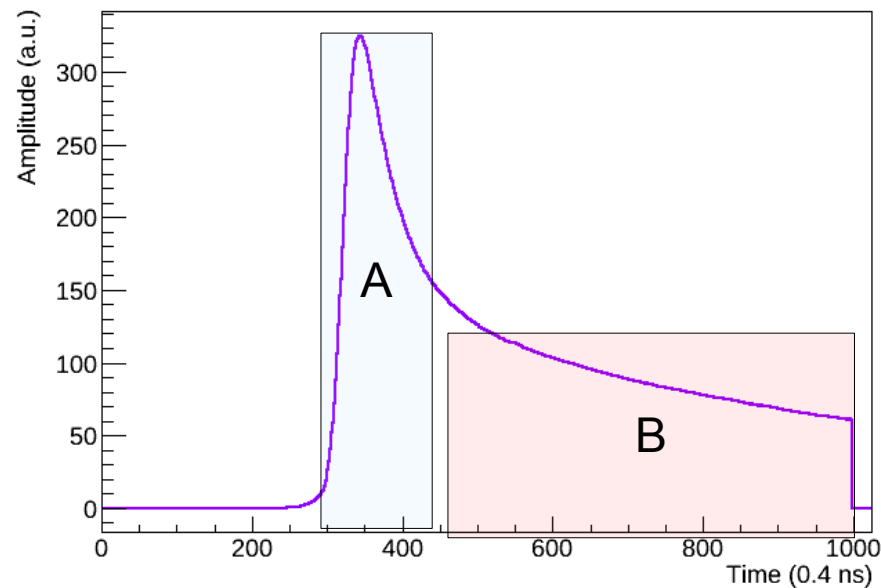
# Analisis method

In order to evaluate the Cherenkov (C) and the scintillation (S) component of the total (Q) light yield all the waveforms were off-line analyzed;

200 superimposed waveforms



Average waveform



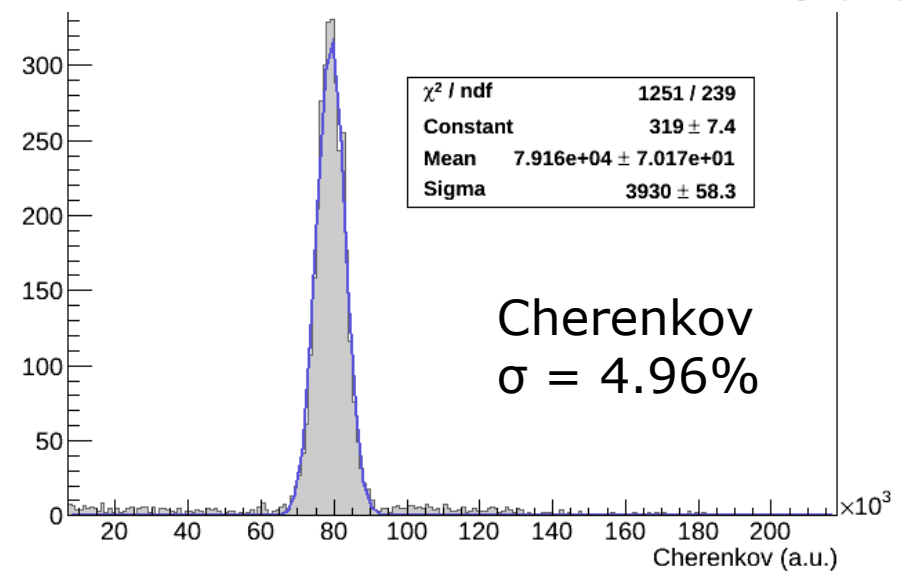
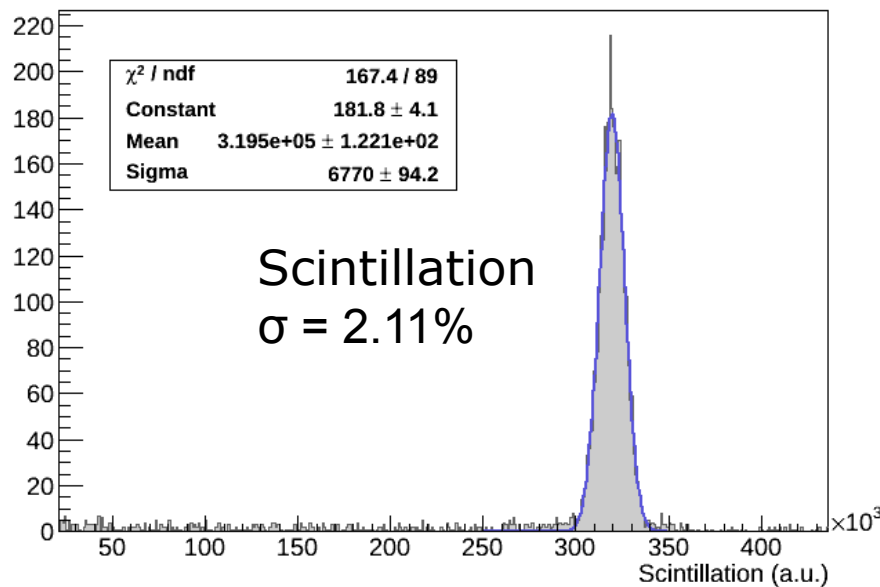
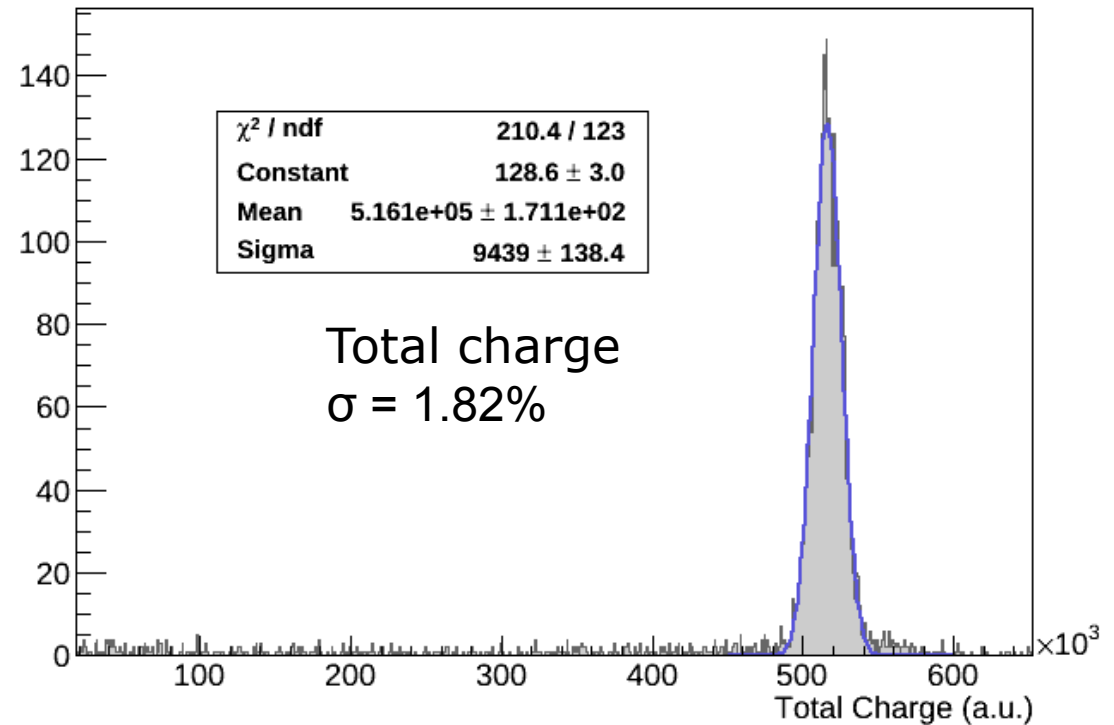
- The waveform is numerically integrated in two gates;
- S and C is evaluated from the two integrals as

$$S = B;$$

$$C = A - 0.35 \times B;$$

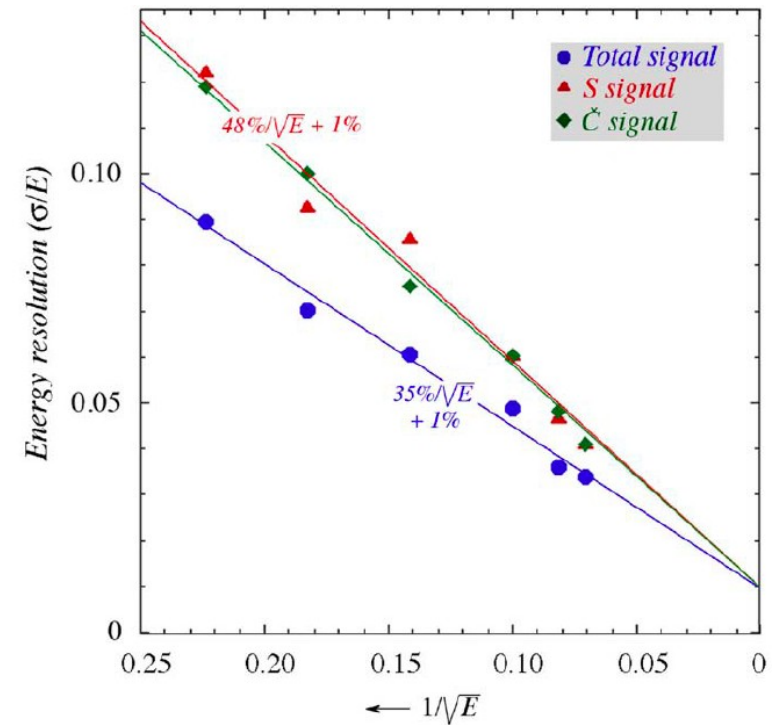
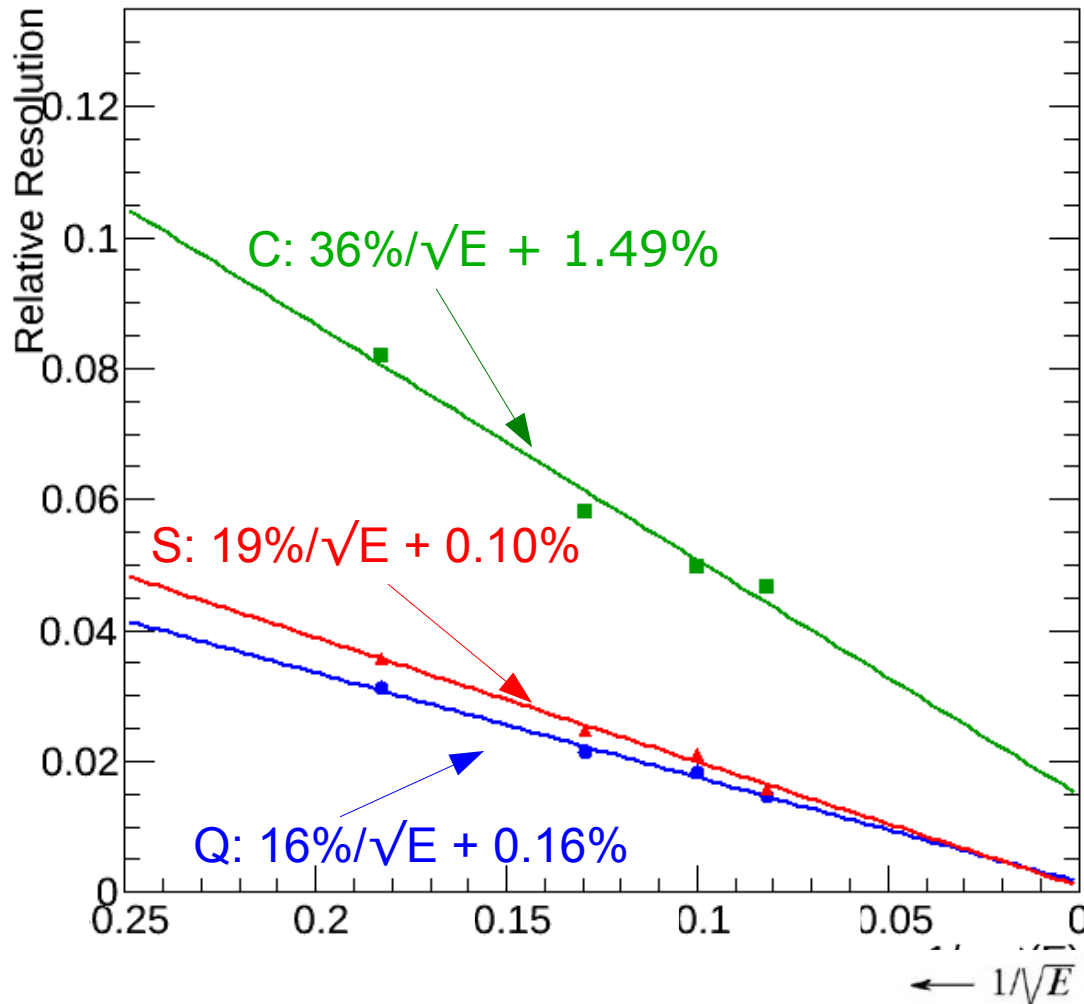
# Resolution for 100 GeV electrons

With the described method the energy resolution obtained by using Q, S and C.



# Resolution as a function of E

The behavior of the energy resolution as a function of the electron energy was studied;



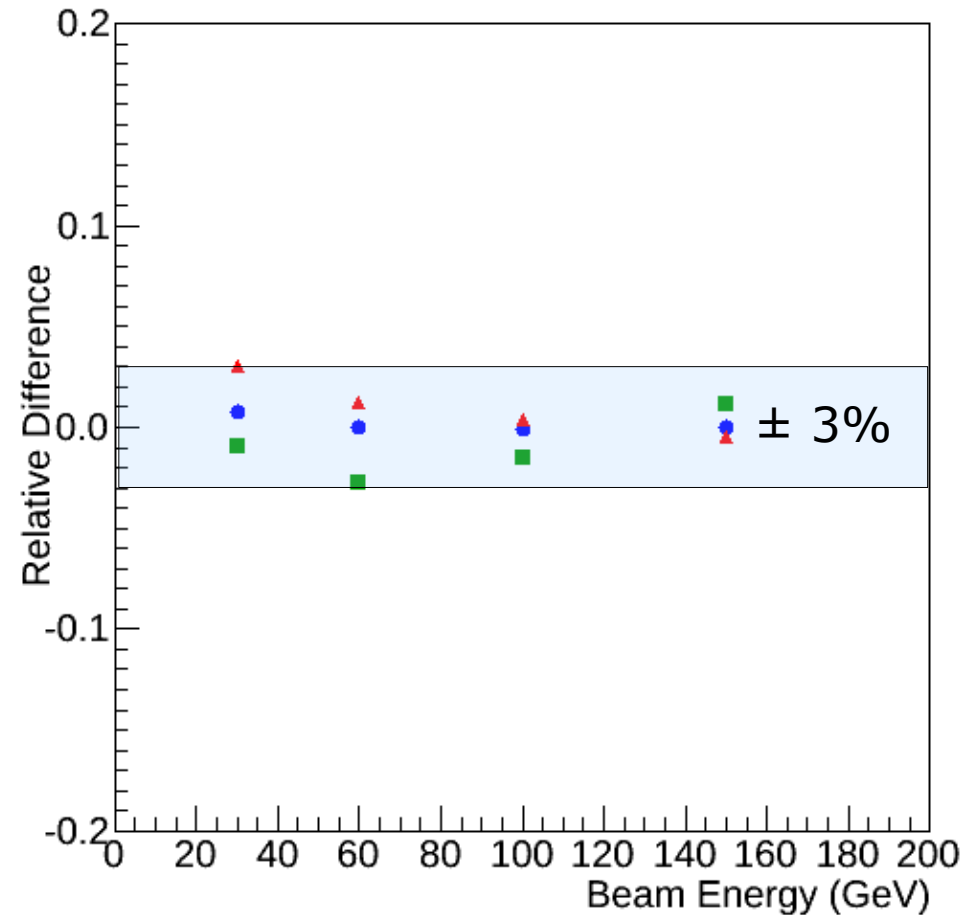
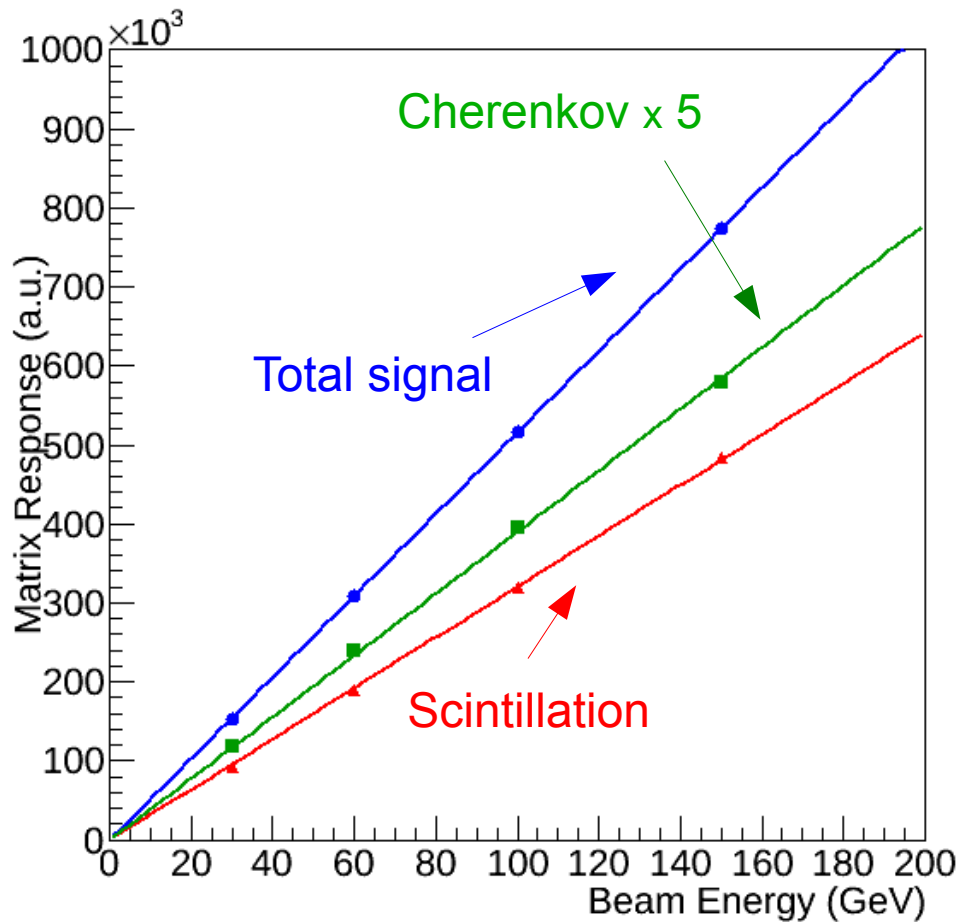
Nuclear Instruments and Methods in Physics Research A 610 (2009) 488-501

With respect to the performance published in 2009, the resolutions are improved by a factor 2;

# Response linearity

The linearity of the BGO matrix response was tested over the hole range (30 – 150 GeV);

No evident saturation was found. A linearity within  $\pm 3\%$  was measured.

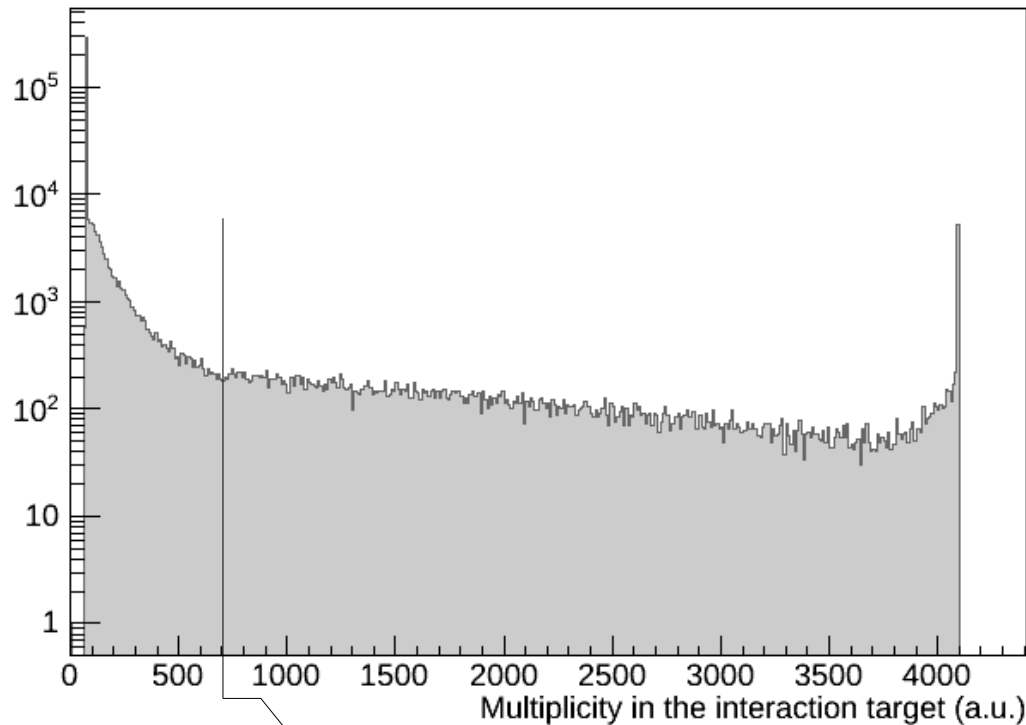


A factor 4 was found between C and S responses

# Pseudo-jets

Pseudo-jets were created by making a 180 GeV pion beam interact with a plexi-glass target upstream of the BGO Matrix;

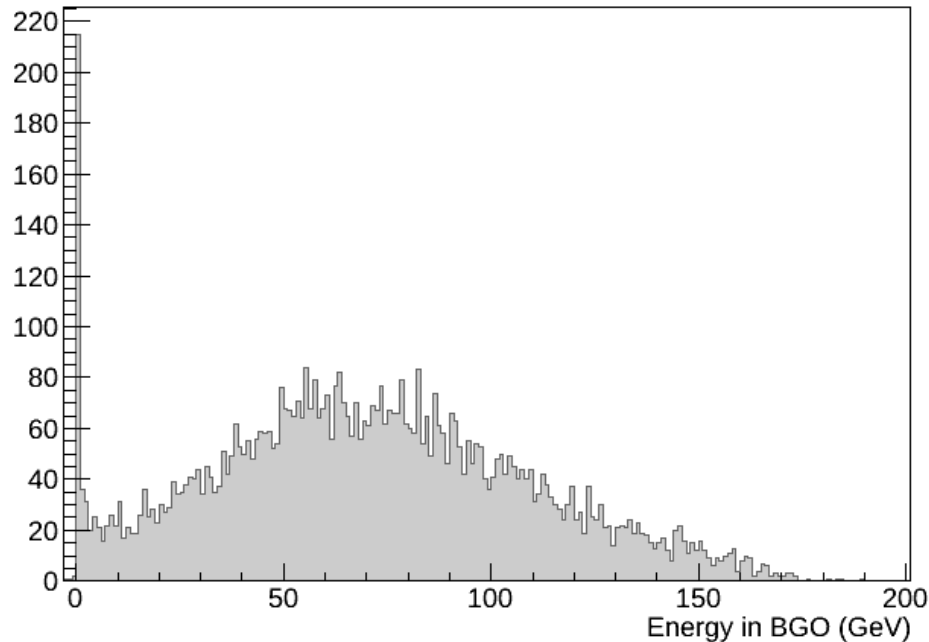
The multiplicity after the target was evaluated by means of a scintillator pad placed between the interaction target and the BGO Matrix;



► For a "multiplicity" larger than 700 a.u. we defined a pseudo-jet;

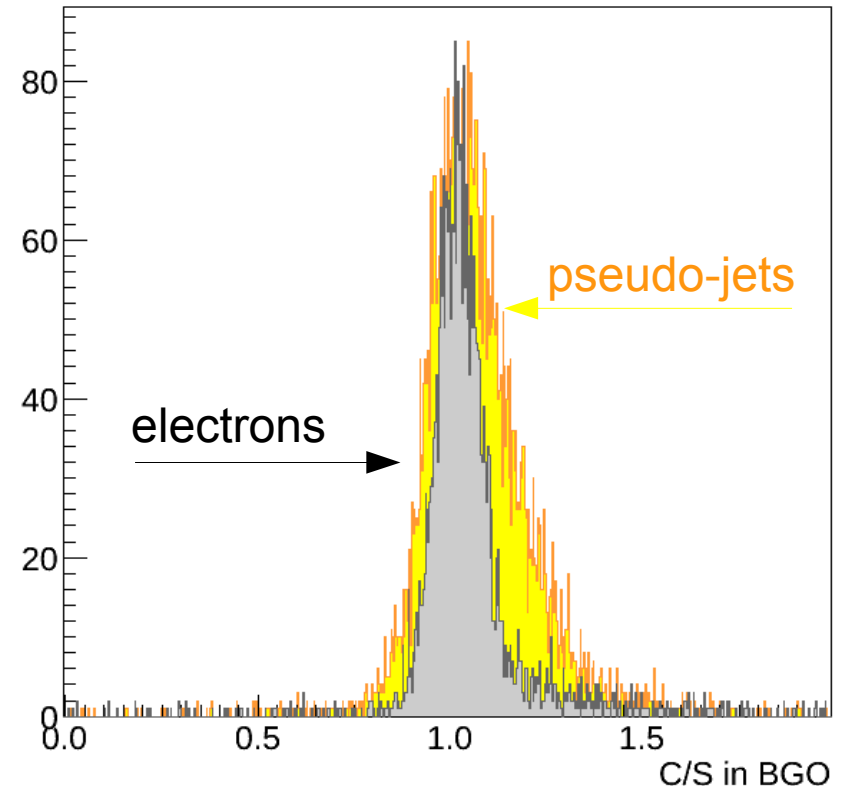
# Energy in the BGO

Pseudo-jets release a lot of energy in the BGO matrix;



Almost 30% of pseudo-jets release more than half of its energy in the BGO matrix.

Need for a compensate measurement

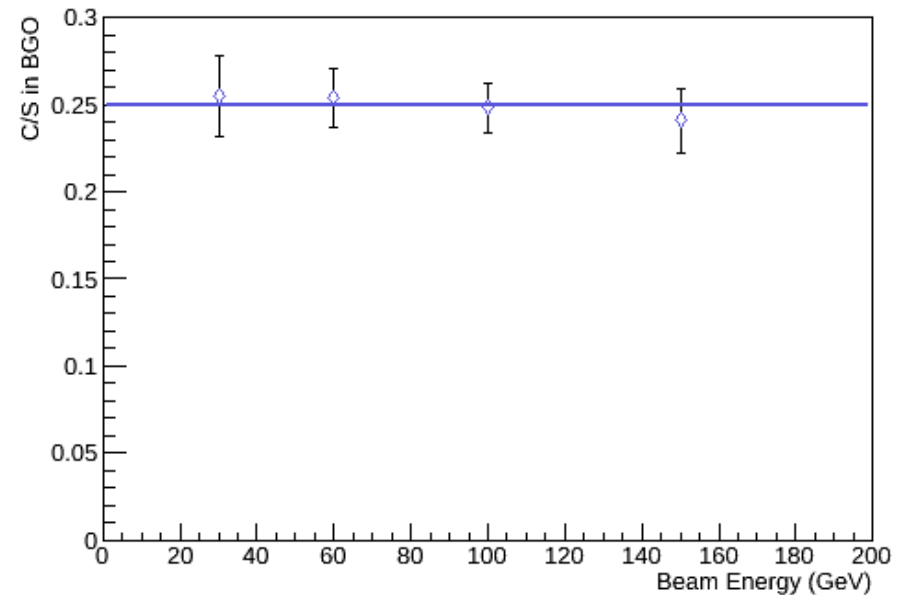
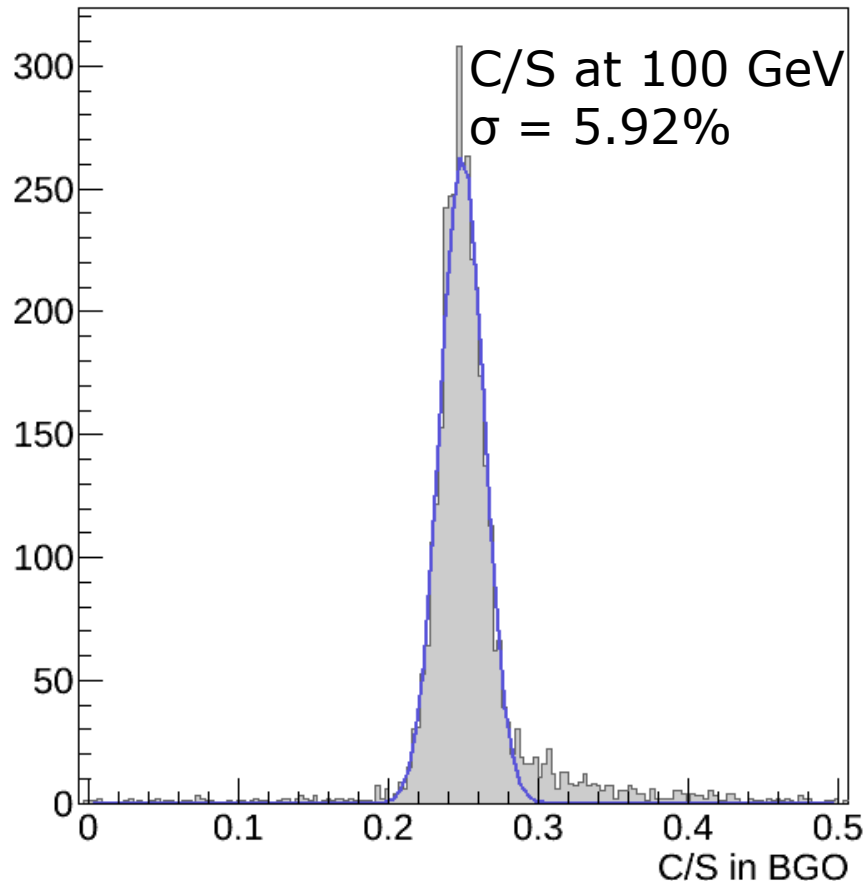


C/S in case of pseudo-jets is quite larger than for electrons because of the fluctuations of the e.m. fraction within the showers.

# The ratio C/S

The ratio C/S is the quantity that allows to evaluate the e.m. fraction of the shower;

For electrons it shouldn't vary from event to event;

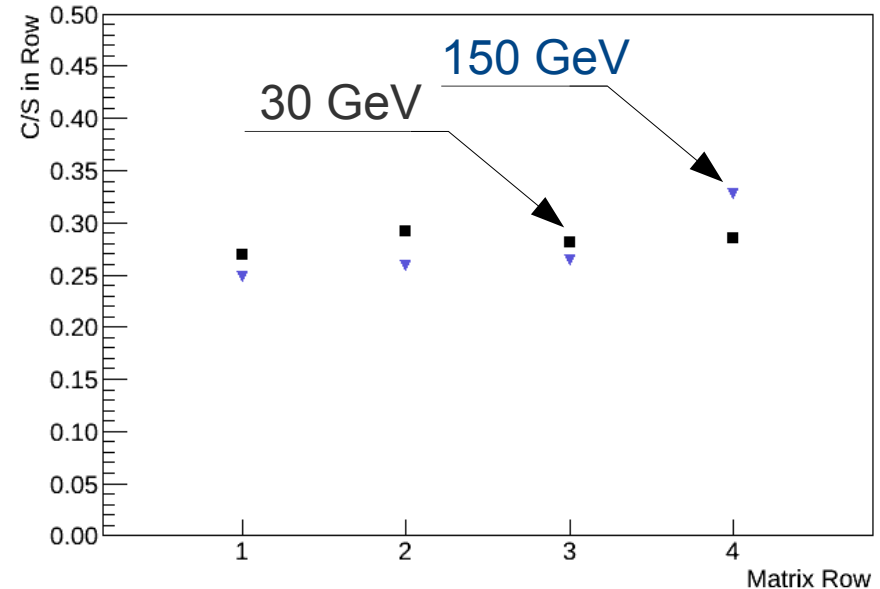
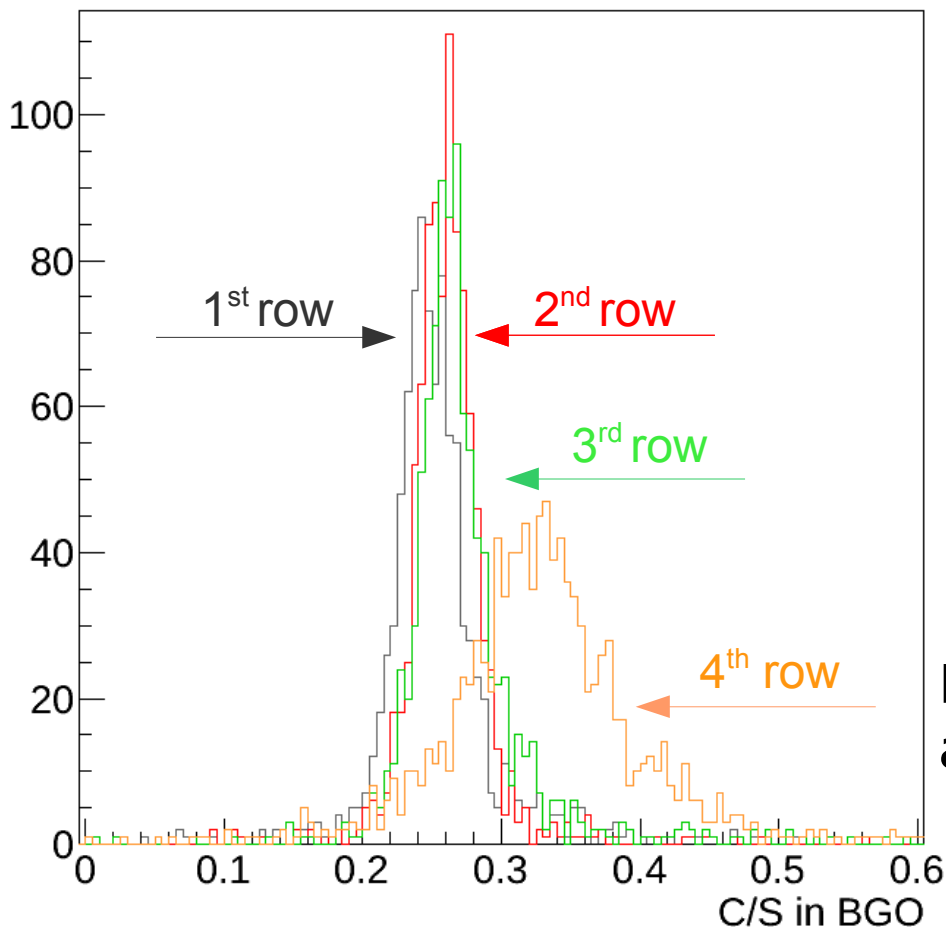


Within the errors, the C/S ratio is independent from the beam energy



# Behavior of C/S within the shower

Because of the directionality of the Cherenkov photons, the ratio C/S can also be used to evaluate the anisotropy of the electrons within the shower, i.e. to evaluate the depth of the shower;



For different energies, the electron anisotropy is reached at different depths