Start counter (Daisy) analysis

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5/10/2017



Data

Data were taken at Trento Protontherapy center in May 2017.

Proton beams at different energies (from ~60 MeV to ~230 MeV) were used.

Analogic signals were acquired in 2 different and independent ways: by an oscilloscope (400ps sampling, internal trigger) and by the electronics of MEG experiment (200ps sampling, external trigger).

The gain (and so the signal amplitude) varies a lot across the four petals.

Some times the signal is very low \rightarrow difficult to see it above the background



Linear fit of the backgound \rightarrow subtracted to the waveform to remove the baseline

Costant Fraction Discriminator

For every petal, signal (blue) has been scaled at 60% (black) and back shifted of \sim 400 ps

A linear fit has been applied to both the peaks (original and scaled) between 20% and 80% of the peak maximum.

The times at which the linear fit intersect has been stored

Events with too low signal (hardly or not at all distinguishable from background) have been excluded.



Oscilloscope CFD



MEG CFD



Conclusions

Notwithstanding one petal shows very low signals, times calculated with CFD method present similar distribution and sigmas.

Data were taken with proton beams. Since resolution improves with the sqrt of number of photoelectrons produced (and so with ionization and Z^2), we expect a better resolution with 12C and 16O.

The Daisy performances should be already adequate for our TOF needs.

Snapshots

