Risultati preliminari della presa dati in cosmici con filtro ottico + WLS + sorgente ^{60}Co

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Database of collected runs

- We collected a set of data in several experimental conditions
  - In each condition, we collected data w/o and w/ ^{60}Co source
  - Typical trigger rate ~0.03 Hz ==> ~2500 events/day
  - Typical daytime temperature~25deg. Unfortunately, temperature is not recorded

Database of collected runs

RUN	Start	Events	Note
318	4/29/2016	7591	CsI(Tl) + 2 pindiode. No Filter on CsI
319	5/2/2016	7746	Come 318, con sorgente. No Filter on CsI
320	5/4/2016	4578	CsI(Tl) + 2 APD (CR110)
321	5/6/2016	9306	come 320, con sorgente
322	5/9/2016	2998	con +5 volt su tutti gli APD
323	5/10/2016	5474	come 322, con sorgente
324	5/12/2016	3260	CsI: Filtro 11S + WLS
325	5/13/2016	8092	come 324, con sorgente
326	5/15/2016	5223	CsI: Filtro 11S + WLS con HV+5V su APD
327	5/16/2016	3338	come 326, con sorgente
328	5/17/2016	3366	CsI: Filtro 5S + WLS - equalizzati guadagni APD
329	5/18/2016	7619	come 329 con sorgente

Preliminary results

- I will show *preliminary* results for the sum of the two APDs, after normalisation to correct for a relative ~25% difference in the response between the two.
- Apply a CR-RC^4 filter with tau=45ns
  - use Novosibirsk function to fit noise distribution
  - compilation of results with different values of tau will follow
  - fancy plots will follow
  - results with APDs on CsI(Tl) crystal will follow

No filter, no WLS

No source

amplitude=3.23±0.02 mV ENE=1.79±0.04 MeV reso= [8.9 (6.6)(*) ±0.2] %

source

amplitude=3.01±0.02 mV ENE=1.92±0.05 MeV reso= [9.1 (6.4)(*) ±0.2] %

(*) Here and in the following pages, the value of relative resolution @30 MeV in parenthesis is the stochastic fluctuation after subtraction of ENE contribution

No filter, no WLS (II)

No source

amplitude=3.29±0.02 mV ENE=1.79±0.05 MeV reso= [8.1 (5.5) ±0.2] %

source

amplitude=2.85±0.01 mV ENE=2.16±0.04 MeV reso= [9.2 (5.7) ±0.2] %

Useful to assess stability of experimental conditions

No filter, no WLS. Increase APD gain (+5V)

No source

amplitude=3.97±0.04 mV ENE=1.42±0.05 MeV reso= [8.2 (6.7) ±0.4] %

source

amplitude=3.58±0.02 mV ENE=1.74±0.04 MeV reso= [8.2 (5.8) ±0.3] %

UV11s filter, NOL9 WLS

No source

amplitude=2.29±0.02 mV ENE=2.70±0.11 MeV reso= [12.5 (8.7) ±0.5] %

source

amplitude=2.30±0.01 mV ENE=2.87±0.05 MeV reso= [12.6 (8.8) ±0.3] %

UV11s filter, NOL9 WLS. Increase APD gain (+5V)

No source

amplitude=3.06±0.02 mV ENE=2.27±0.07 MeV reso= [11.4 (8.5) ±0.4] %

source

amplitude=3.07±0.03 mV ENE=2.30±0.08 MeV reso= [10.7 (7.4) ±0.4] %

UV5s filter, NOL9 WLS

No source

amplitude=2.64±0.02 mV ENE=2.08±0.07 MeV reso= [10.2 (7.4) ±0.5] %

source

amplitude=2.40±0.01 mV ENE=2.16±0.05 MeV reso= [11.1 (8.4) ±0.3] %

Summary & outlook

- With filter + WLS
  - signal decreases by ~35% (compare ~70% with filter only)
  - As expected, ENE is much less affected by background wit
  - Conversely, statistical fluctuations increase by 55% with 11S filter, by 35% with 5S filter
- I think we collected all the data we need, as discussed in previous meetings
- compilation of results with different values of tau will follow
- fancy plots will follow
- results with APDs on CsI(Tl) crystal will follow