preliminary results from KL studies at BTF
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- The data available for KL studies are:
  - 2 complete energy scans for 1 or 2 KL layers
    - without splitter (runs 124-176)
    - with splitter (190-229)
  - one point with splitter at 100 MeV without the 3 TOF slabs in front of KL (317)
  - one point with splitter at 100 MeV with increased HV (+60V) (277-284)
- start with 2 KL layers looking at linearity and resolution
- the total energy is computed in two ways
  - sum of all the adc channels (total)
  - sum of (PM1xPM2)/(PM1+PM2) over the 6 modules multiplied by 4 (total2)
Outcome of preliminary studies: warnings

- pedestals have moved between the two energy scans and have to be computed from the data
- \(d\text{Adc} (\text{ledTdc})\) vector structure: even without pedestal suppression, when all the channels are present, data from channel \(n\) are not stored in \(d\text{Adc}\) vector element \(n\).
- *We recommend to loop over the hits, identify the hit channel using vector \(\text{chAdc}\) and fill a private vector with all the hits in the event!*
- The hardware equalization performed in lab with cosmics and the software equalization factors computed there do not apply to the second scan, at least for one channel (9) which appears to be much lower than its twin (8). We empirically multiplied it by 1.2 by minimizing the total width at 200 MeV. More detailed equalization studies are needed for both scans.
single particle selection

- to select single particles we cut between 400 and 600 counts in the second scan data (200 and 260 on first scan) on the raw Adc 0 ch 12 distribution (TOF)
preliminar linearity plots

- a factor 2.15 difference due to the splitter (& cables)
- better linearity at low energy in the first scan (no splitter)
- offset at 0 energy compatible with expectations from run without TOF (250 counts difference at 100 MeV)
- leakage for energy $>150$ MeV
preliminar resolution

- comparable between the 2 scans but for pathological points
  - 200 MeV in first scan
  - 150 MeV in second scan
- deterioration at high energy due to leakage
- to be investigated: effect of TOF presence at low energy
workplan

• check equalization for both energy scans
• improve the event quality selection using in the second scan also the TDC information
• finalize linearity and resolution results

• longer term:
  – time resolution studies at nominal HV and at HV+60V
  – comparison of SW response between 2 KL and 1 KL
  – correction of longitudinal leakage using SW