PMT Signal Simulation

Mariana Lima Migliorini
Universidade Federal de Juiz de Fora (UFJF)

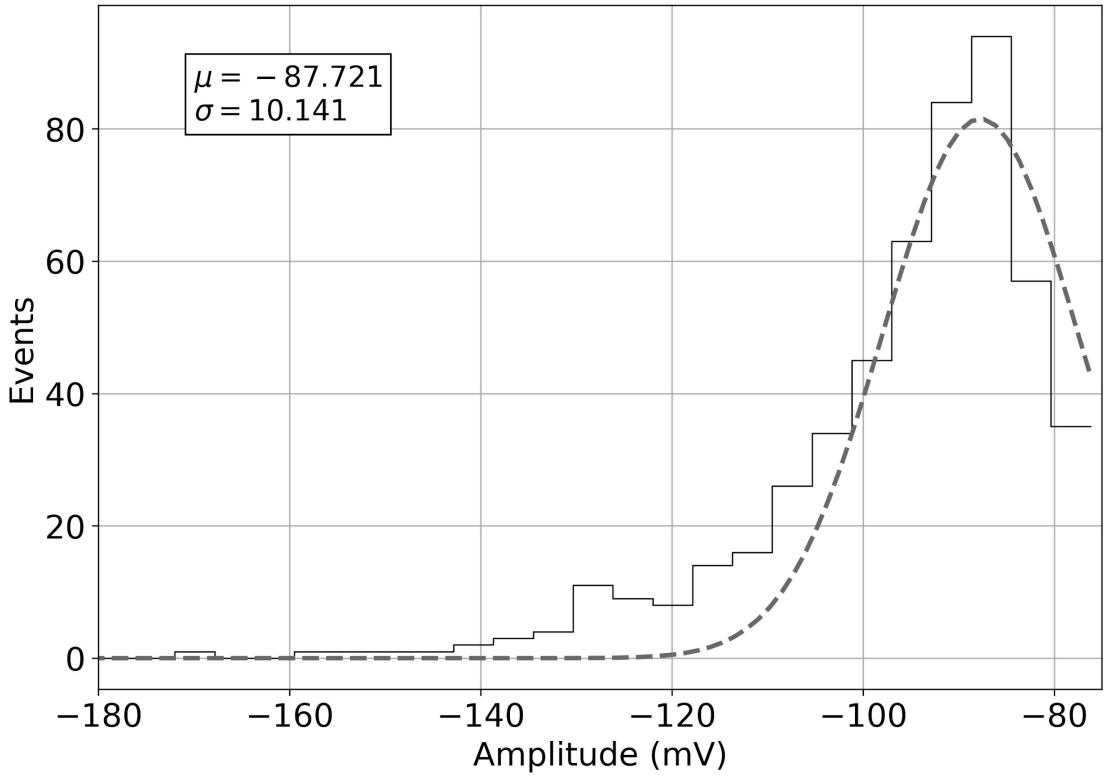
*with **Davide Pinci** (INFN-RomaI) **and Rafael A. Nobrega** (UFJF)*

May 28, 2020

Objective

- **Single electron signal characterization;**
  - Run in use: 2274;
    - ^{55}Fe dataset;
    - 1000 events;
    - Events discarded:
      - Corrupted events;
      - Events with offset below 16 mV;
    - Signal offset removed using noise mean estimation;
    - Short signals dataset were separated.

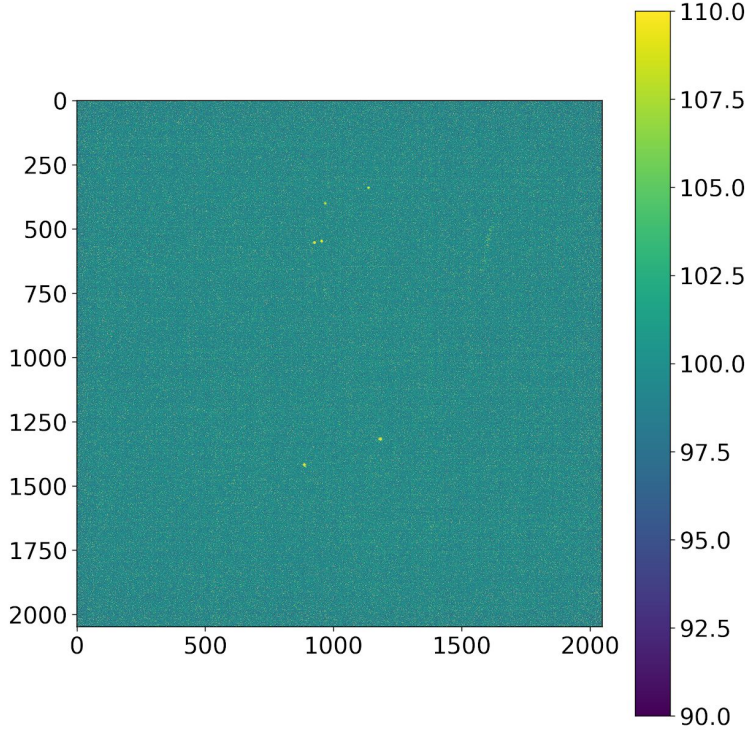
Peak amplitude distribution

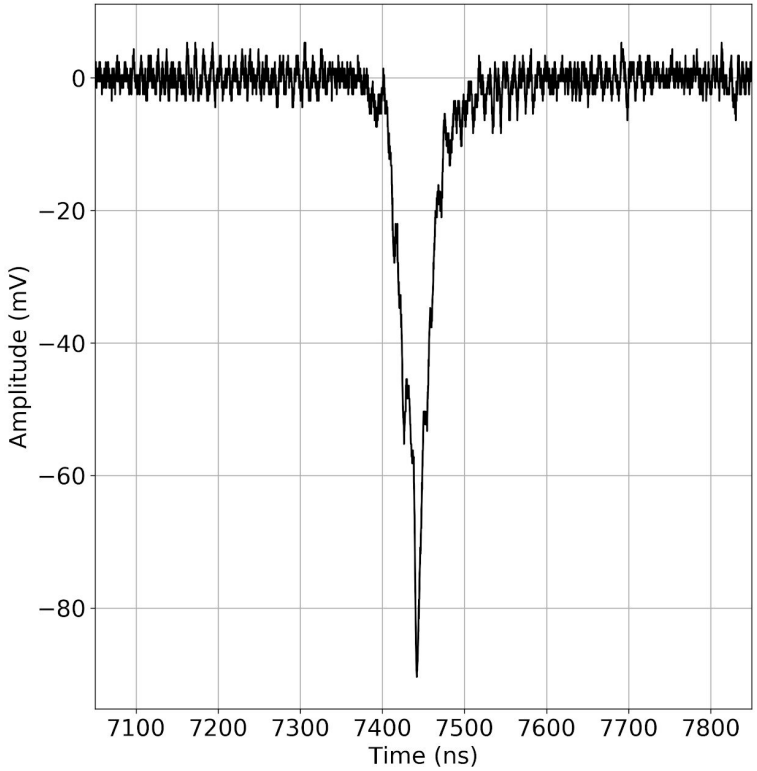


- Short signals only;
- Cut in -180 mV;
- Around 11 events with peak amplitude lower than -180 mV;
- Lowest signal: -76 mV.

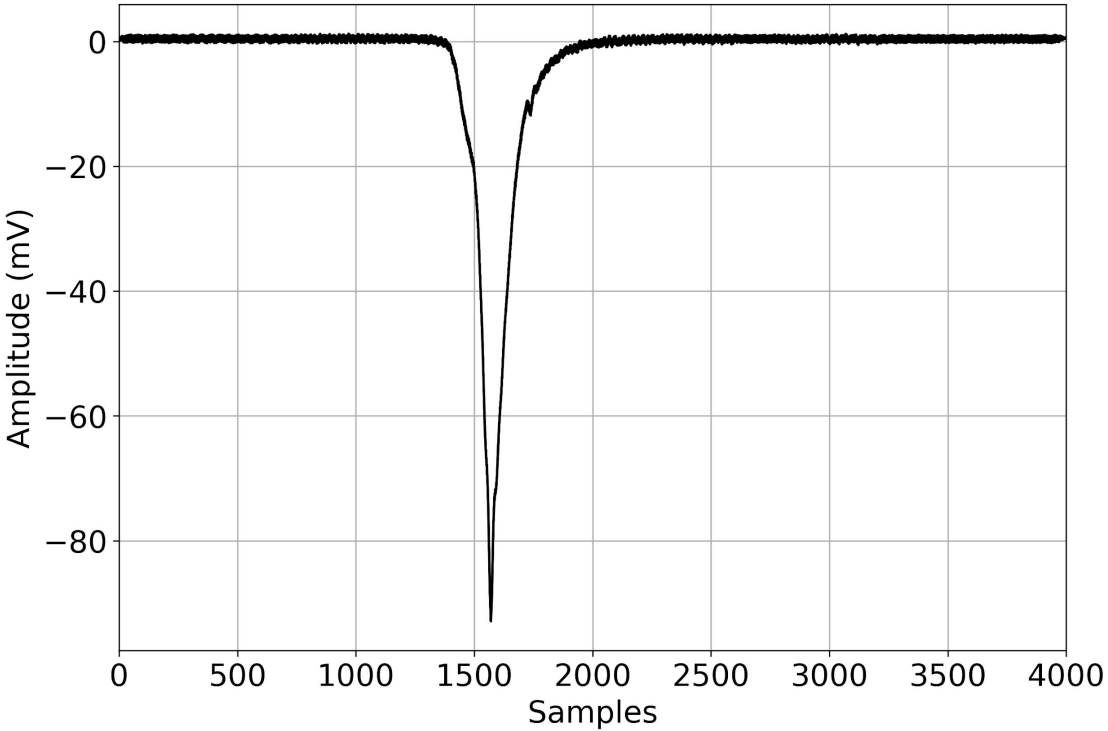
Could be due to the applied threshold??

^{55}Fe event


0
250
500
750
1000
1250
1500
1750
2000
0
500
1000
1500
2000
110.0
107.5
105.0
102.5
100.0
97.5
95.0
92.5
90.0


0
−20
−40
−60
−80
Amplitude (mV)
7100
7200
7300
7400
7500
7600
7700
7800
Time (ns)

Mean signal



- Short signals with peak amplitude greater than -120 mV selected;
- Their peaks were centralized;
- Mean signal obtained;

Energy to number of electrons

- Calibration factor for the number of created electrons: 1e-/40eV;
- Signal amplitude calibration factor: 0.66 mV/e- ;
- ^{55}Fe event energy: 5.9 keV;
- Number of electrons created in ^{55}Fe events: around 148 e- ;