OMC4DBD ^{136}Ba data: analysis of time evolution of γ-lines in HPGe detectors

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Motivation

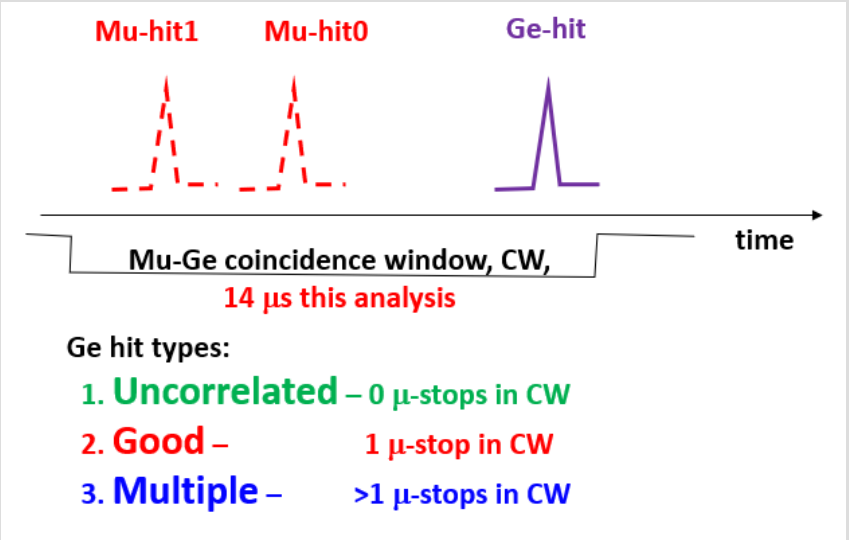
- **Testing of different methods to analyze time dependences of γ-lines.**
- **Required for determination of global, partial capture times calculations, separation of isotope production mechanisms (direct OMC? vs beam production), etc.**

Data processing method

- Using Analyzer to produce 2 TTrees with muons and ge hits, sorted by time (DUBNA trees) for each runs (~ 5 minutes) which corresponds to MIDAS run.
- Basic parameter – μ-ge-hit coincidence window (CW). 14 μs in this analysis.
- Processing each ge-hit in cycle. Taking energy in particular range (big γ-peaks) and build 3 types of spectra: Good (1 μ-stop in CW), Multiple (> 1 μ-stop in CW) and uncorrelated

μ & ge-hit event structure

```
typedef struct
{
    Double_t energy;
    Double_t time;
    uint16_t module;
    uint16_t channel;
    uint8_t status_flag;
} base_event;
```



Ba data: processing statistics

- **1390 runs (~ 85 h) in the data list:**
  - **1 series – 441 runs (~ 27h)**
  - **2 series – 949 runs (~ 58 h)**

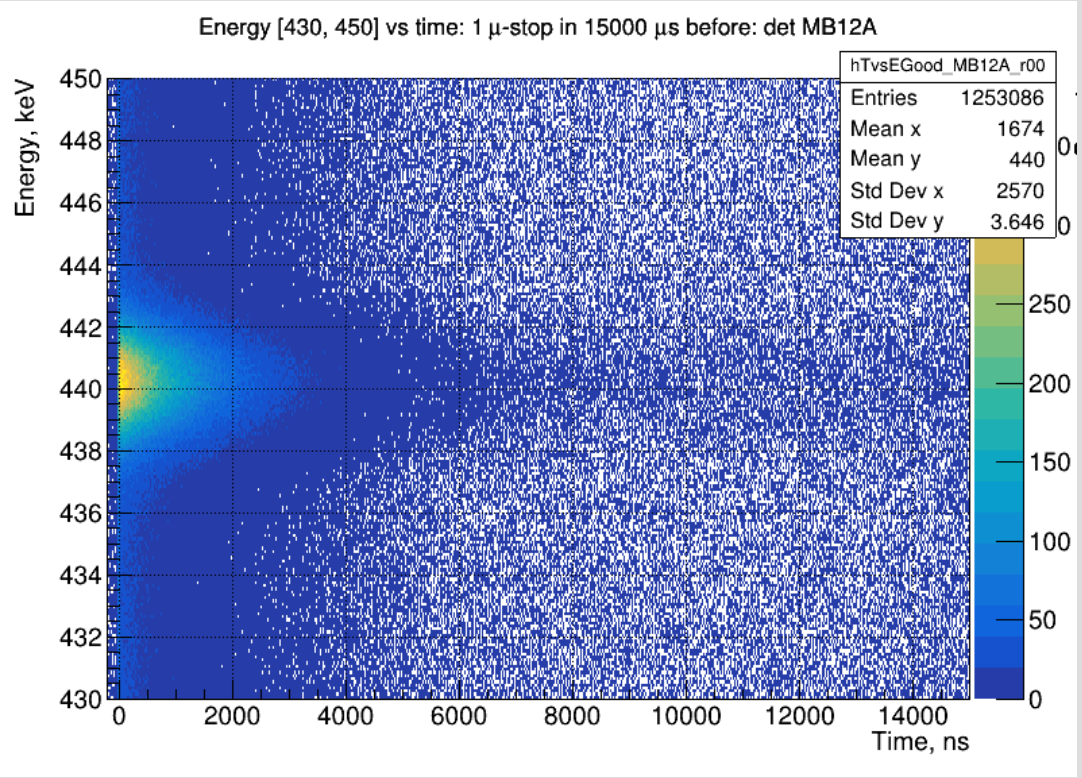
Muon logic:

"Incoming muon" – C_1 & not(C_0) hit : could be optimized further

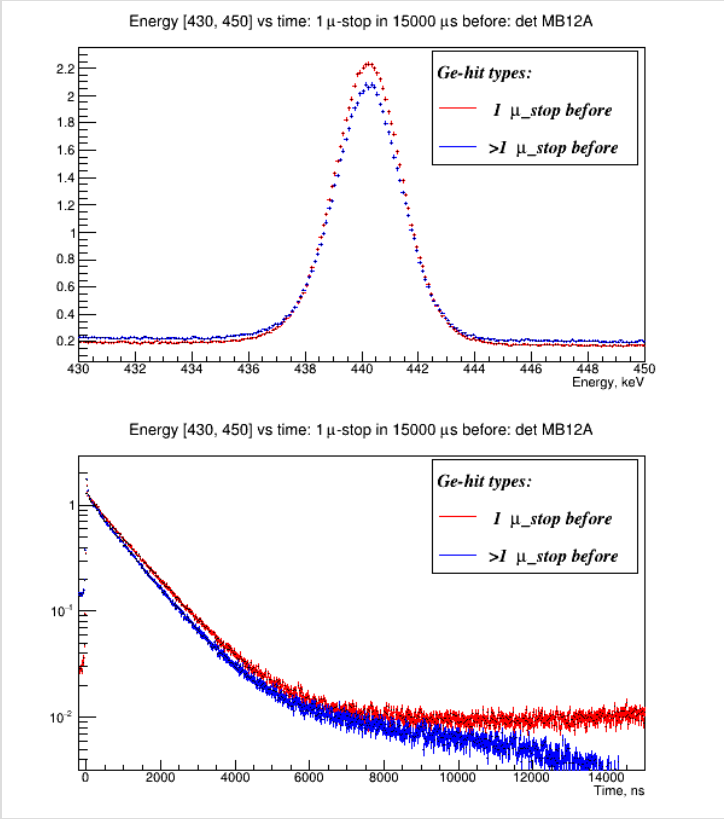
Mg-24 spectra

- Here all methods are demonstrated on the ^{23}Na line 440 keV (the strongest in the correlated spectrum)

2D Time vs. energy



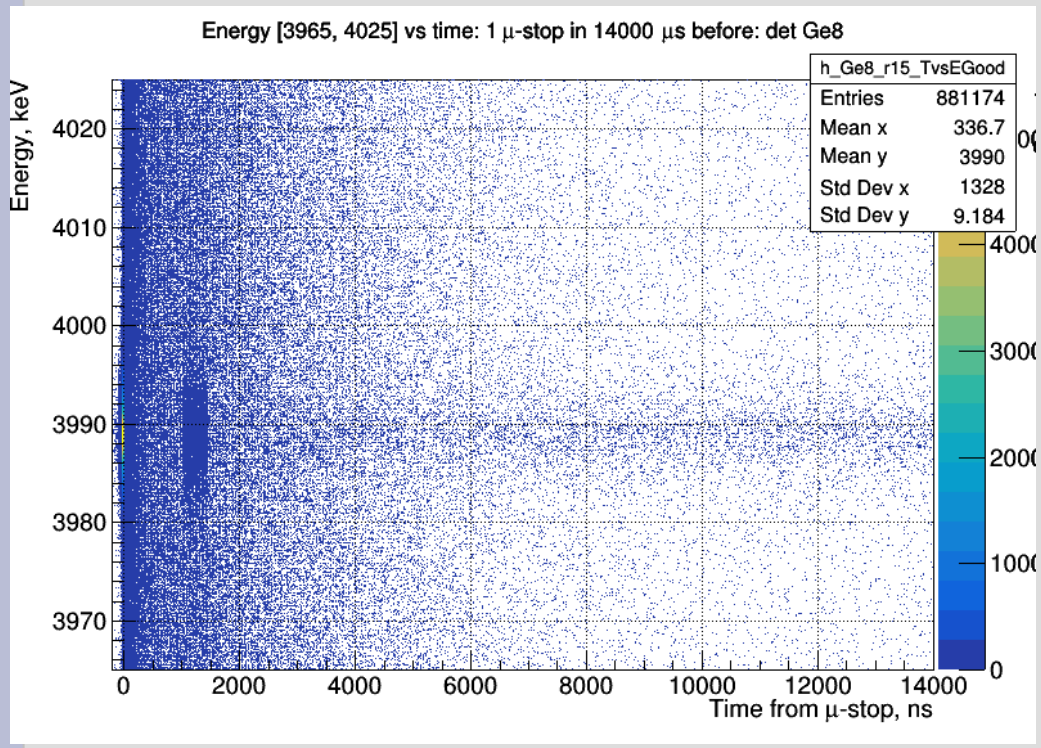
X/Y-projections for Good/Multi



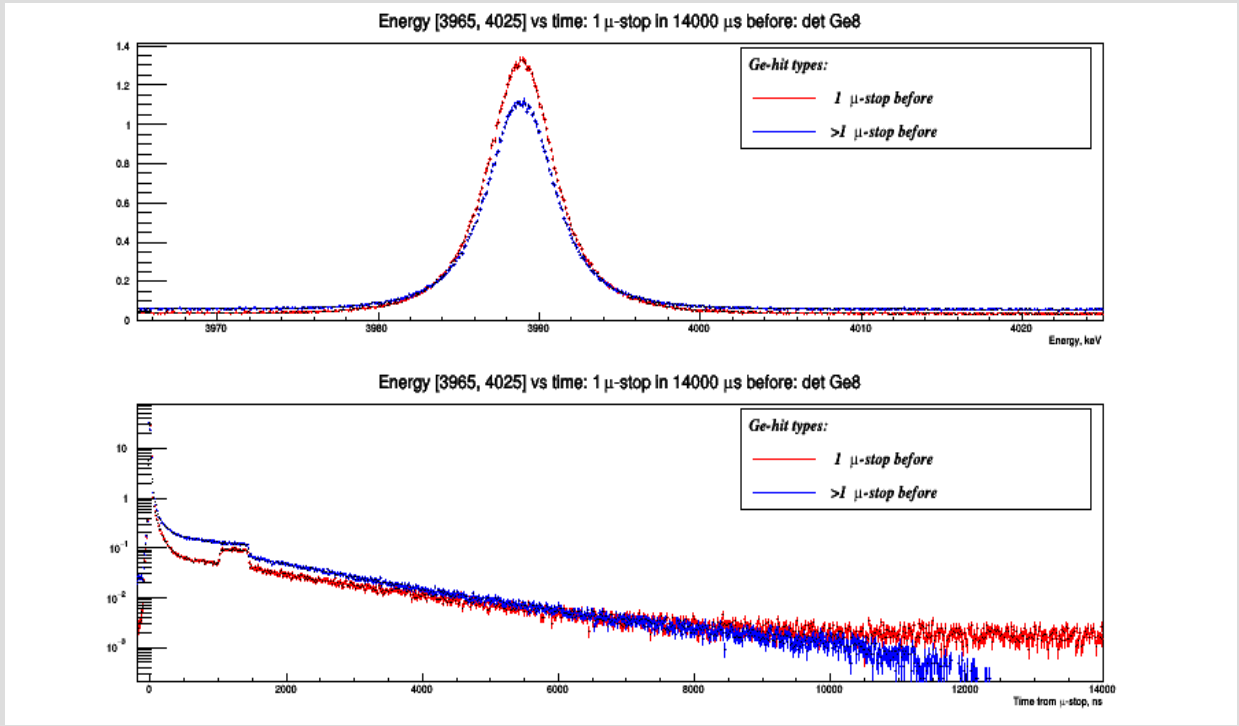
Ba-136 spectra

- Here all methods are demonstrated on the ^{136}Ba line 3991 keV (the strongest in the correlated spectrum)

2D Time vs. energy



X/Y-projections for Good/Multi



Further steps

- **2D E/T histos in two T windows (long < 14 mks & short < 1.45 mks)**
- **Look (fit) at time evolution of OMC correlated g-lines**
- **Analysis with Michel-electrons with C3 counter.**