Update 08/05/2024

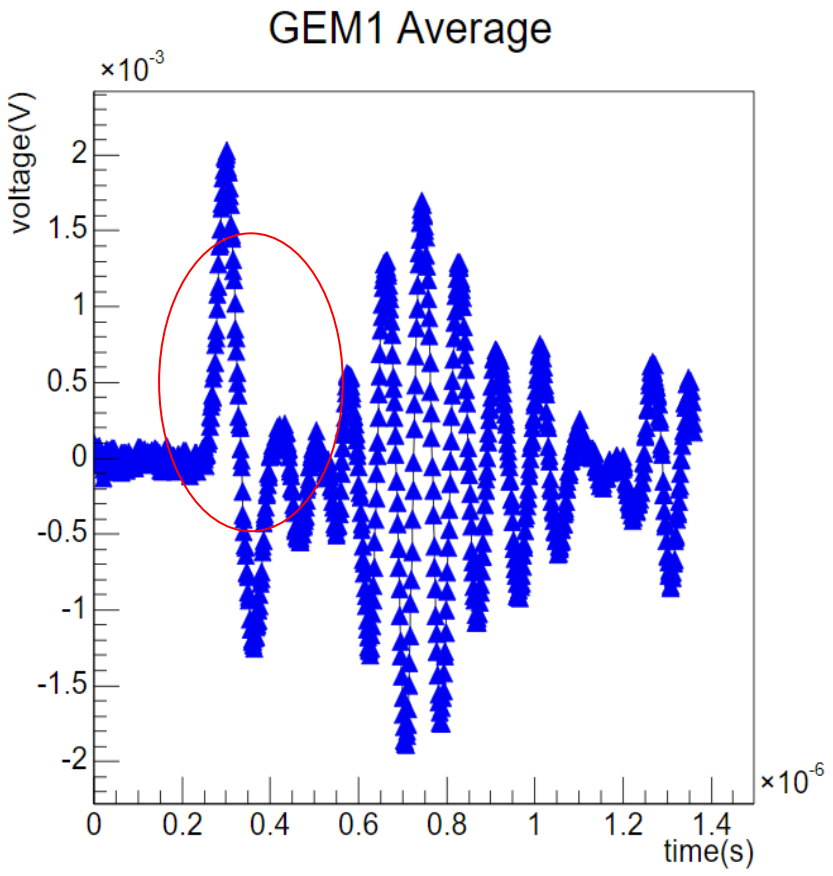
Update on GEM signals

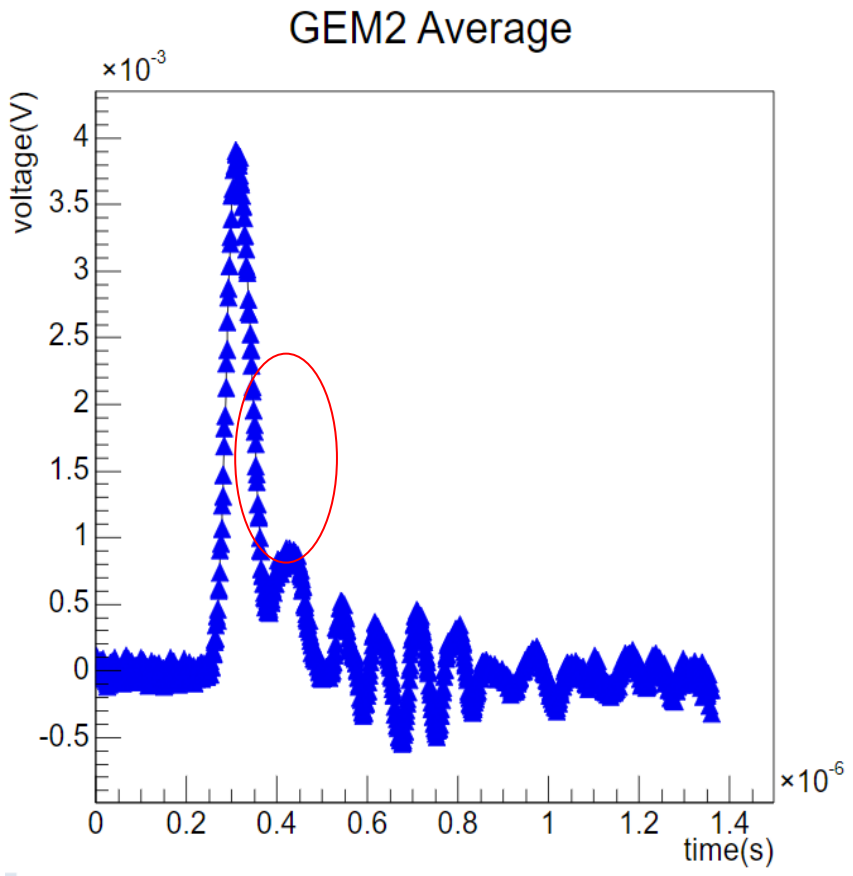
GEM signals

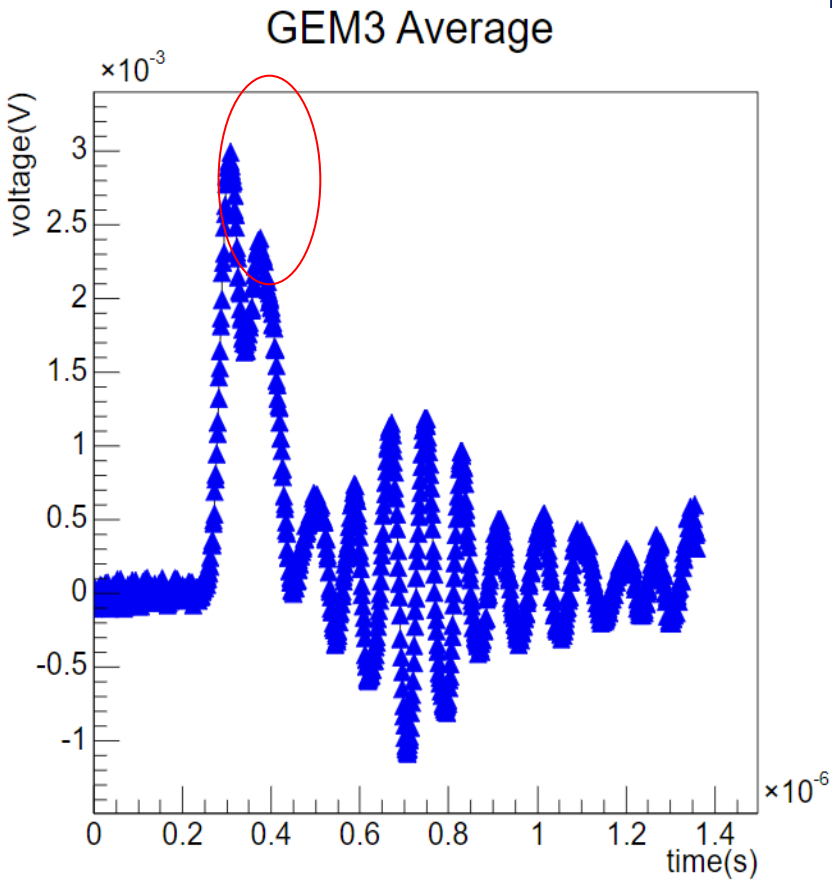
- I took Run 50898 to try (calibration run with 55Fe)
- I'm reading the GEM signal
  - Matching the ADC impedance (we're reading half of the V)
  - removing the amplification (G=10)
  - sampling 4ns
- Code: fiorotto8/GEMsignals_LIME (github.com)

Average signals over Run

- Averaging all the waveforms from the run



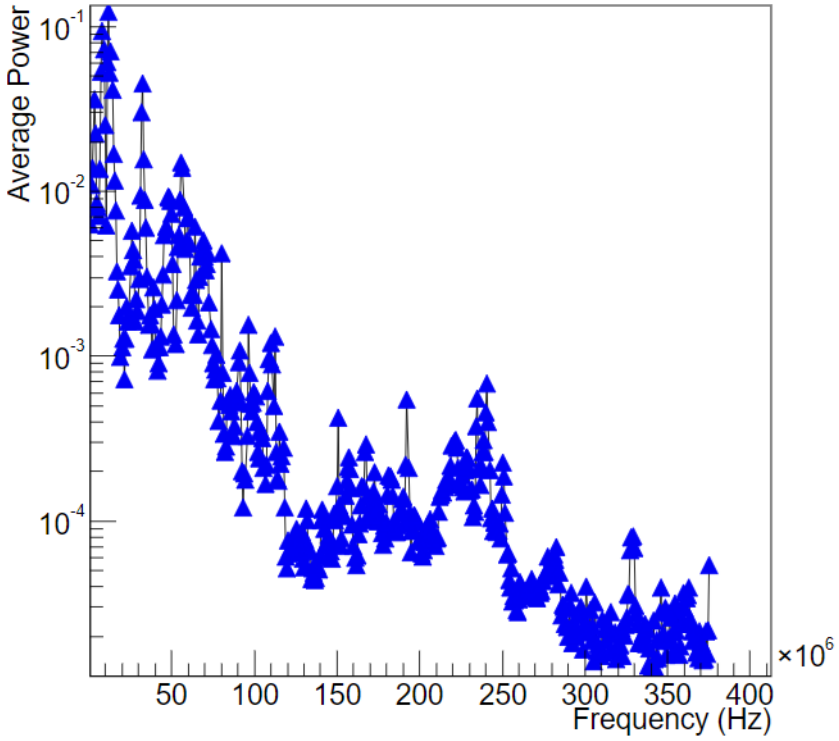




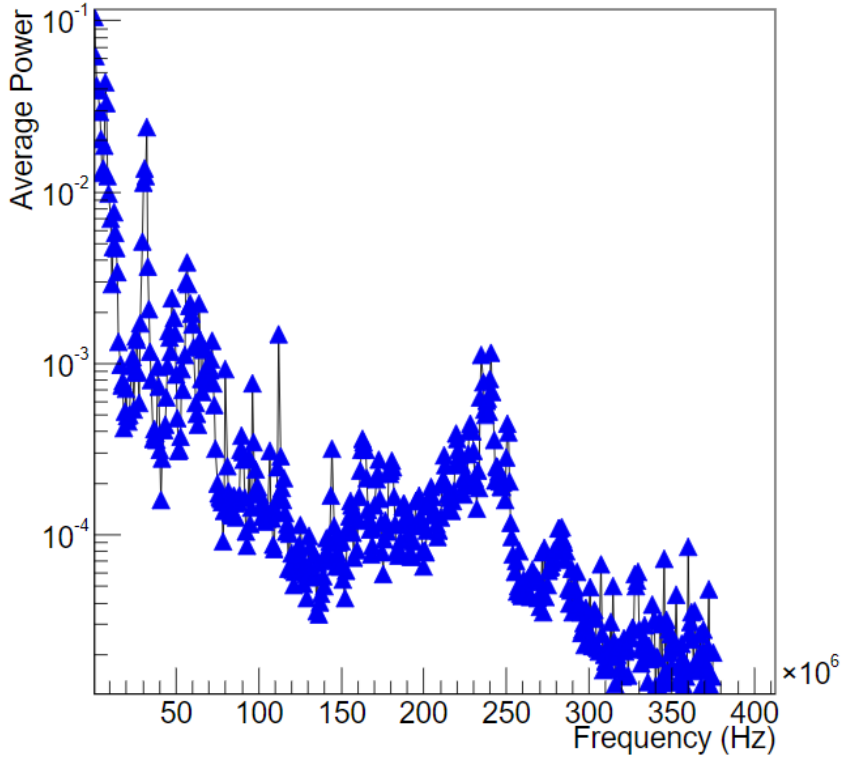
- I'm convinced that the signals are reflected, 70-80ns i.e. around 4m of cable
- Flickering noise afterward is not averaged out maybe it is crosstalk between Amplfier channels?

FFT

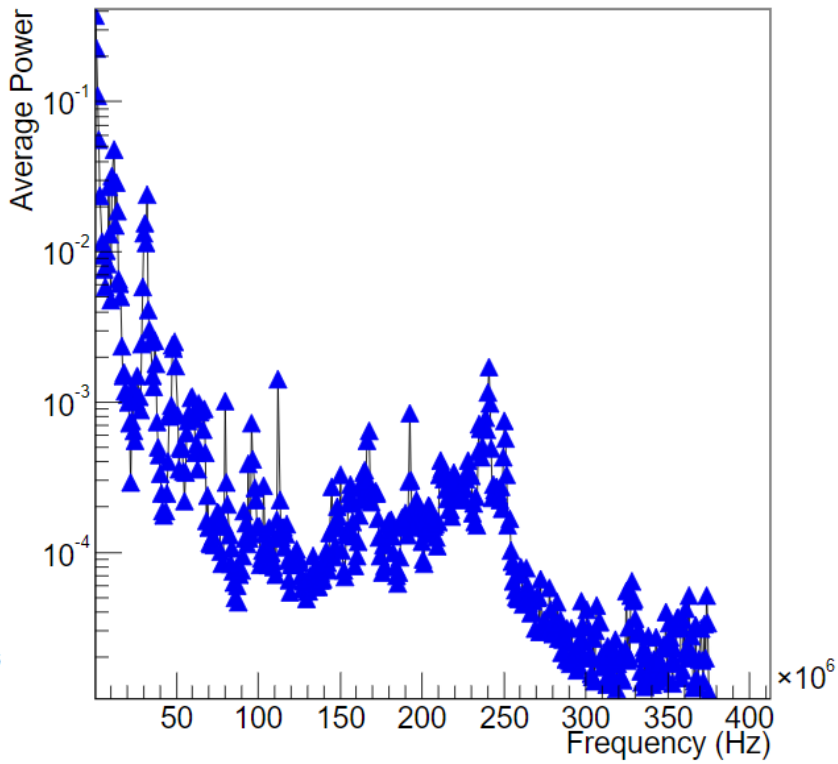
GEM1 Average FFT



GEM2 Average FFT



GEM3 Average FFT

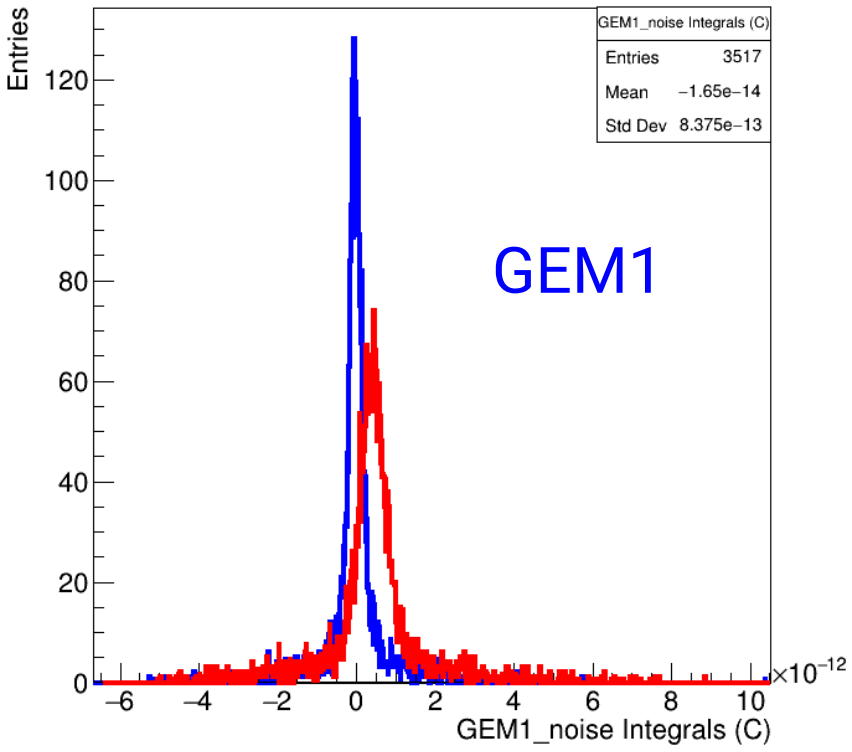


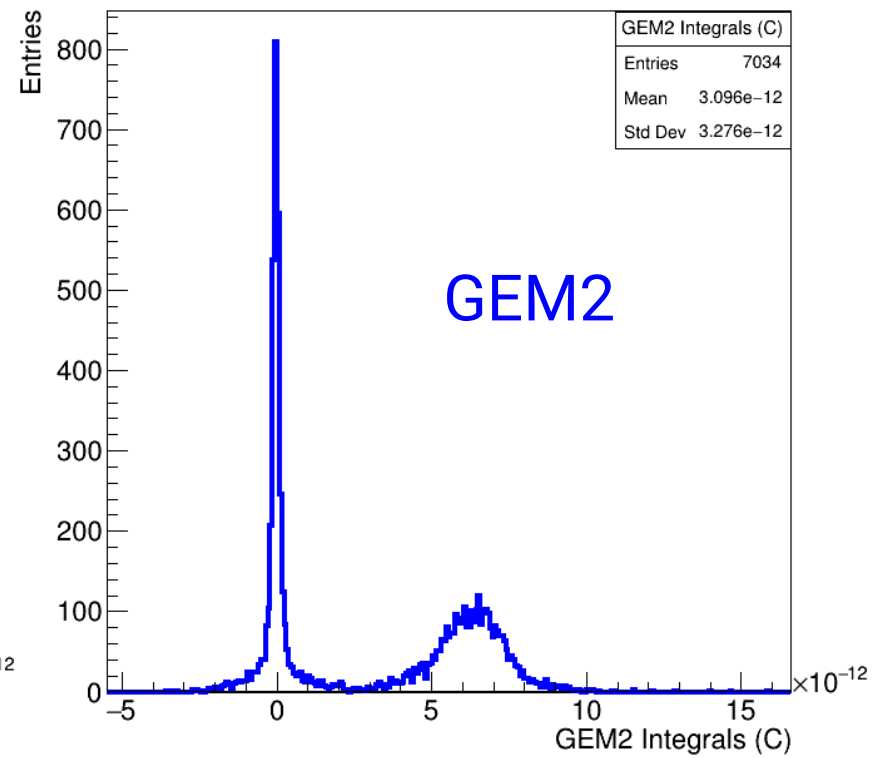
Flickering noise and signals have more of less the same frequency 200-300MHz
I tried a lot of filters but none work nicely…

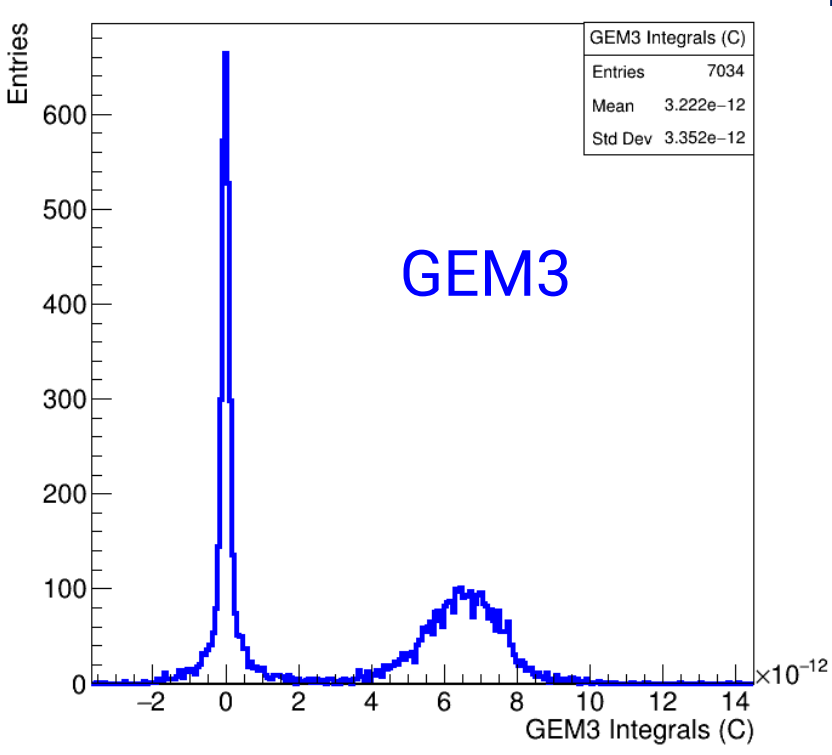
GEM Integrals

- I tried to integrate the signals right before the reflection peak

	Charge	Effective gain (n0=150)
GEM1	0.45pC	1.8E4
GEM2	3.16pC	1.3E5
GEM3	3.3pC	1.37E5



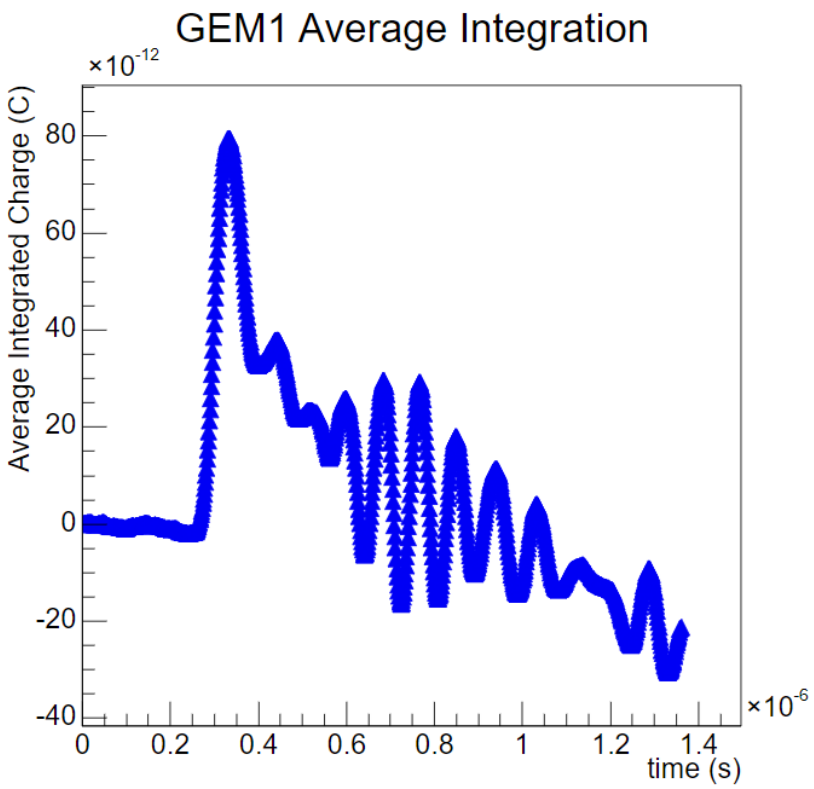


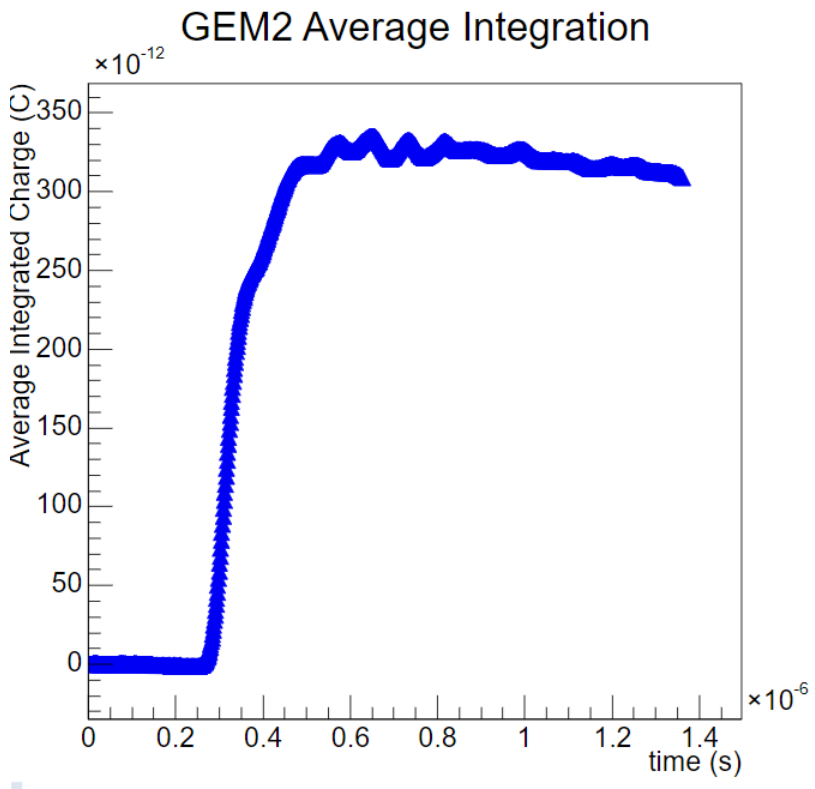


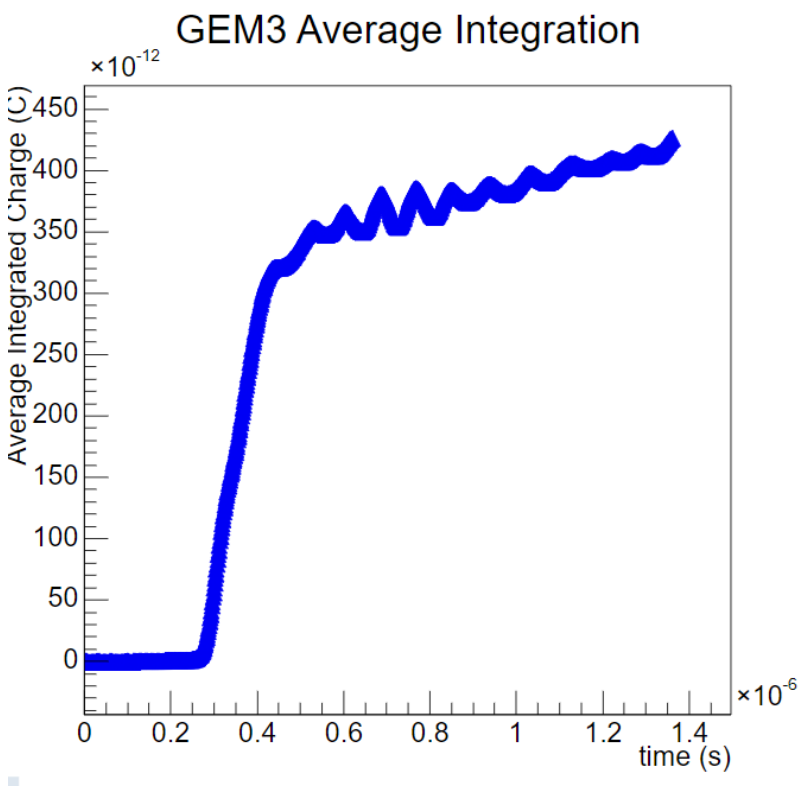
Integrator like approach

- Instead of integrating the signals, we can add software integrator
  - Preamplifier with no band-pass and decay time (100us)
- GEM1 signal is affected by strong reflection that kills the signals while G2 and G3 are what we like
- Gains are similar but the G1 since now we get more the interested charge

	Charge	Effective gain (n0=150)
GEM1	0.8pC	3.3E4
GEM2	3.16pC	1.3E5
GEM3	3.5pC	1.4E5







Conclusions

- Basic class to get GEM signals
- Focused now on the Gain measurement (saturation…)
- Are the gain measurement good? are we losing something?
  - In case we are basically not multiplying anything in GEM3
- Hints for the future
  - The connection GEM to Amplifier seems good
  - But I still think these are reflection
  - The ampplfier may be moved near as possible to the GEM to match the impedance earlier