Scintillation time settings (arXiv:nucl-ex/0409014)

- Time constants and fraction of 3 components
  - Only consider two kinds of decay time shapes: gamma-like and alpha-like

Type of irradiation	Decay constants, μs		
	τ_1 (A_1)	τ_2 (A_2)	τ_3 (A_3)
γ ray	0.7 (2%)	7.5 (9%)	25.9 (89%)
α particles	0.7 (4%)	5.6 (16%)	24.8 (80%)

  - When dE/dx <= 5, scintillation photons are always gamma-like
    - The shape chosed in different cases ↓

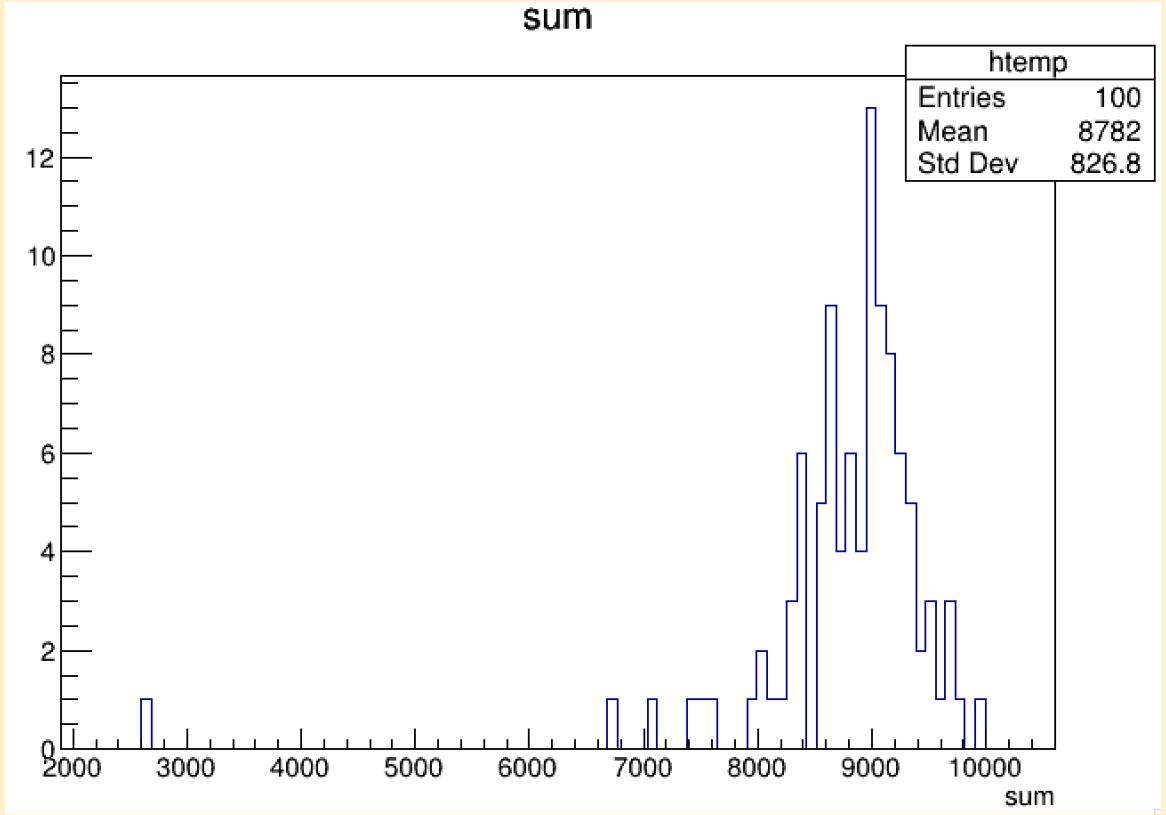
	e+/e-	**p**	**pi**	**n**	**alpha**
dE/dx<=5	γ-like	γ-like	γ-like	γ-like	γ-like
dE/dx>5	γ-like	α-like	α-like	α-like	α-like

Samples with scintillating process

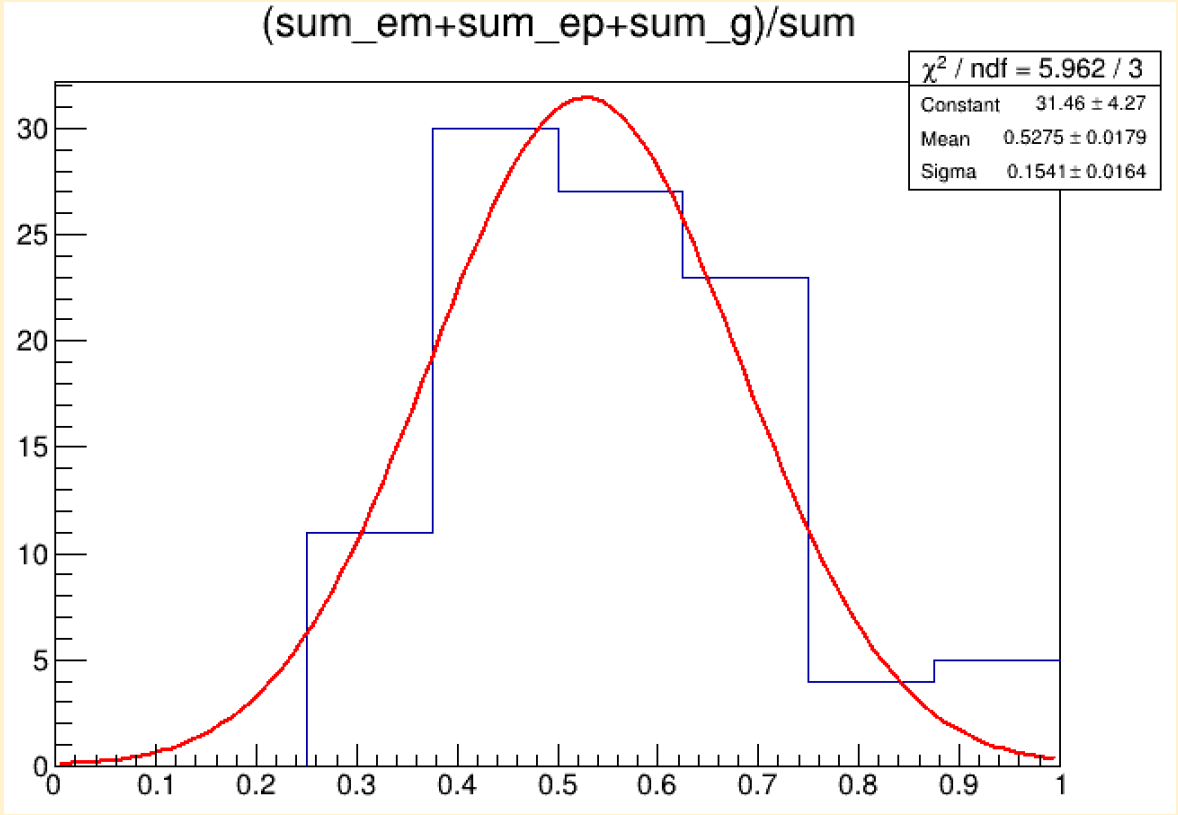
- Generate the event with scintillating process
  - Save all the scintillating photons
- Prescale the sample assuming the efficiency of optical photon to photon-electron is identical for all the optical photons.
  - Light yield in generation: 10_000/MeV
  - Photon-electron yield in prescale: 10_000/GeV
  - Randomly pick the photons based on the yield ratio and step energy
- 100 event of pi+ and e- are generated.

With 100 events (pi+ and e-)

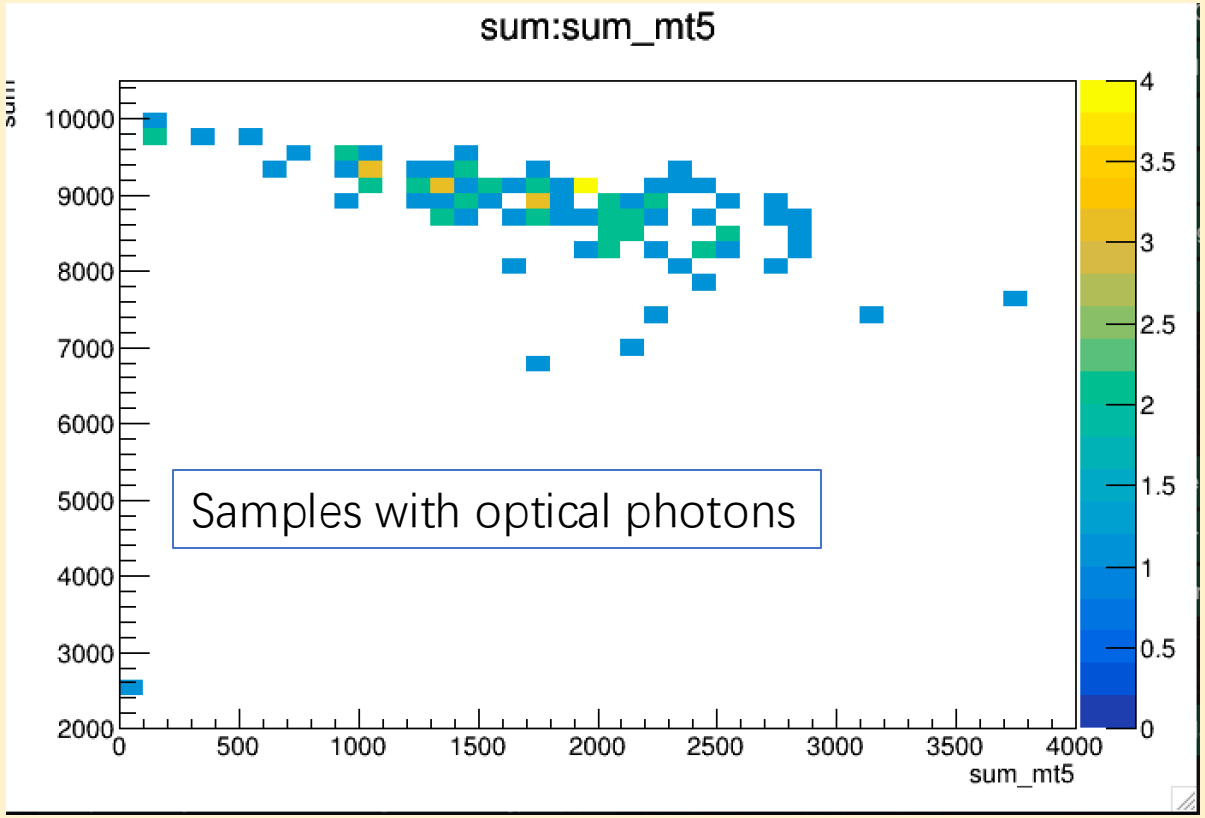
- For the 10 GeV pi+

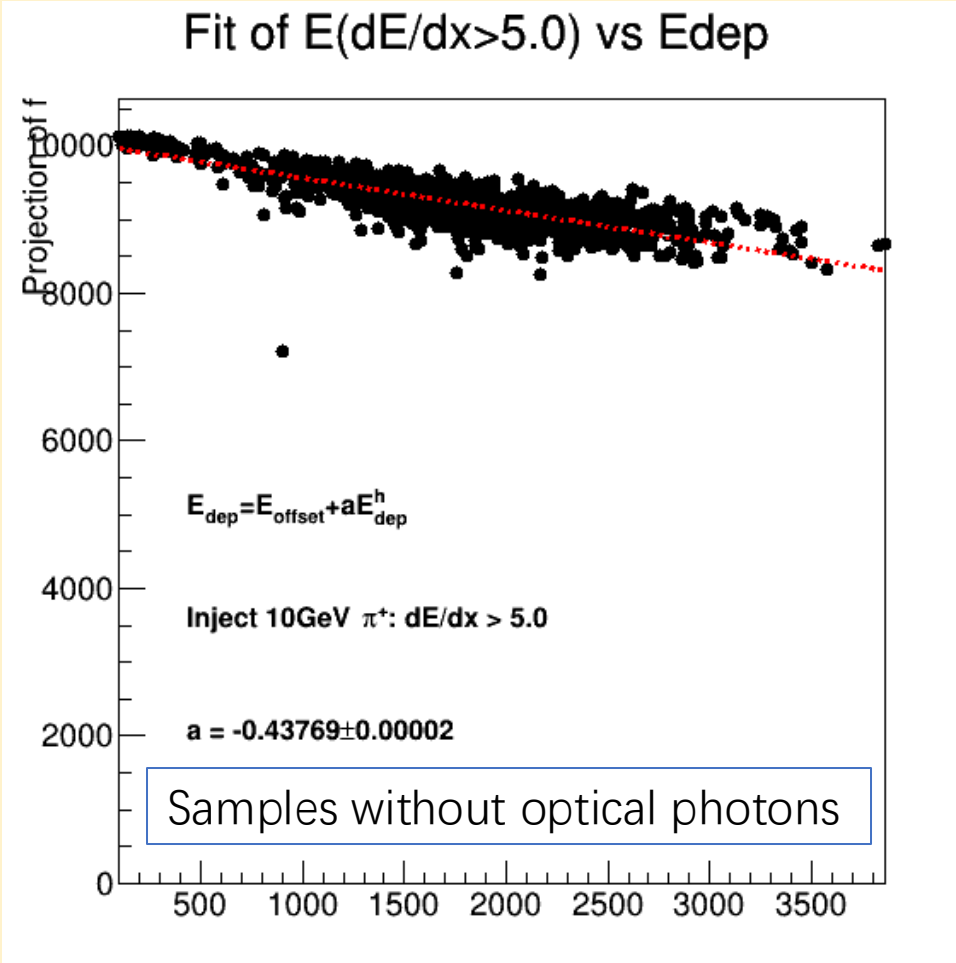


Fraction of EM energy (deposited)

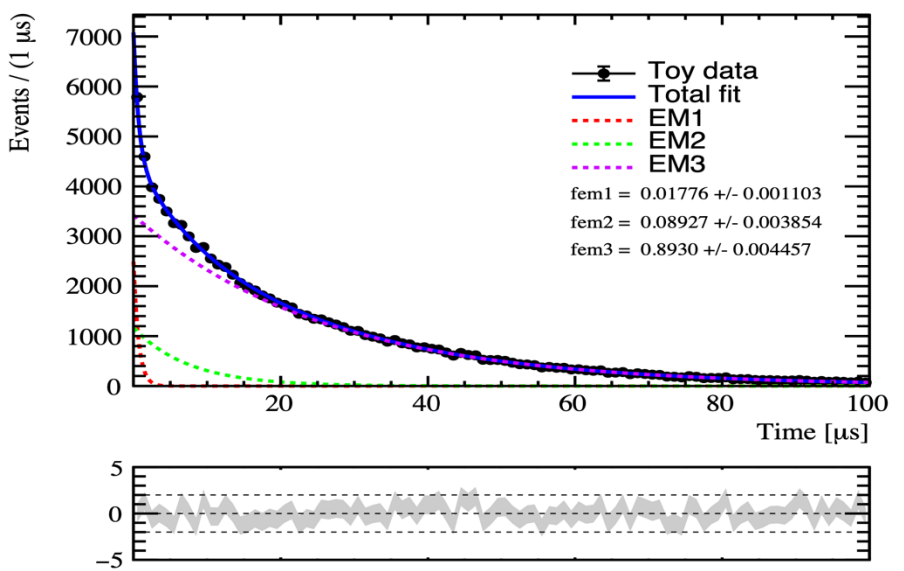


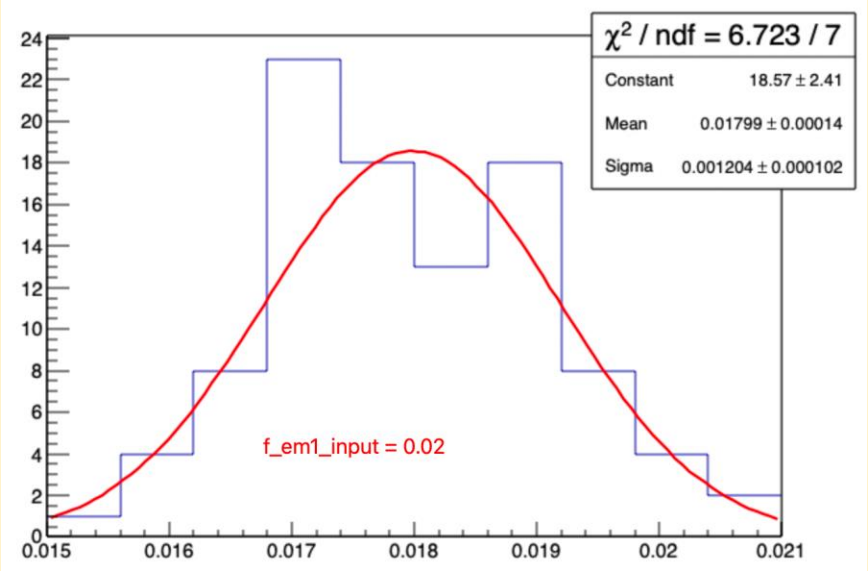
The energy correlation

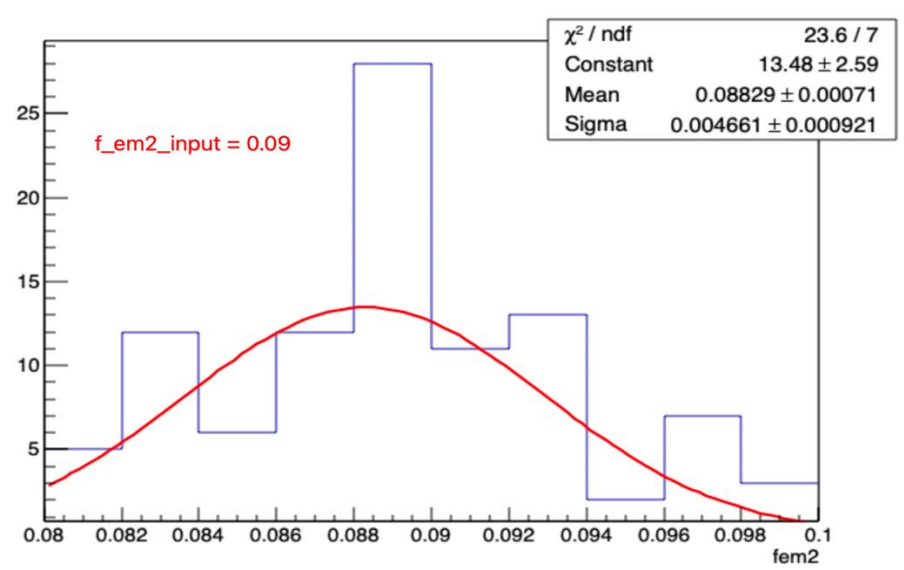


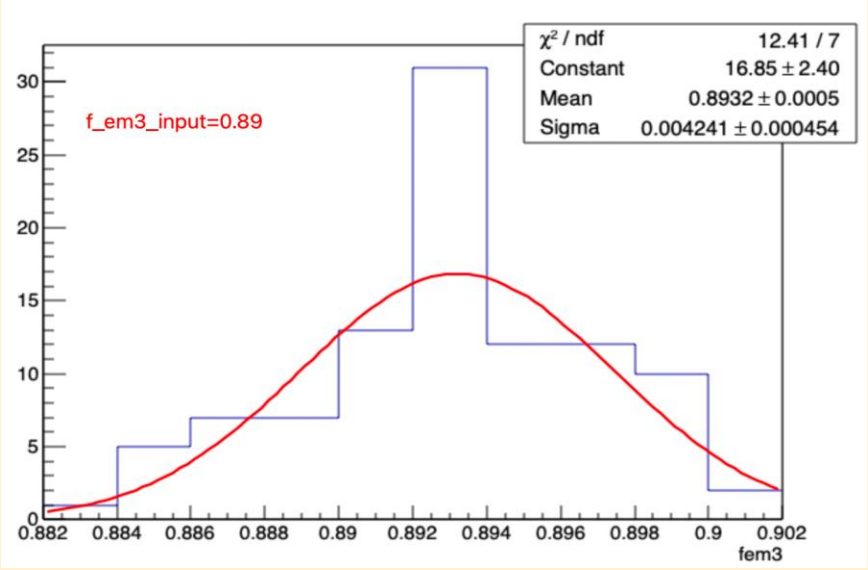


Fits to the EM energy (e-)

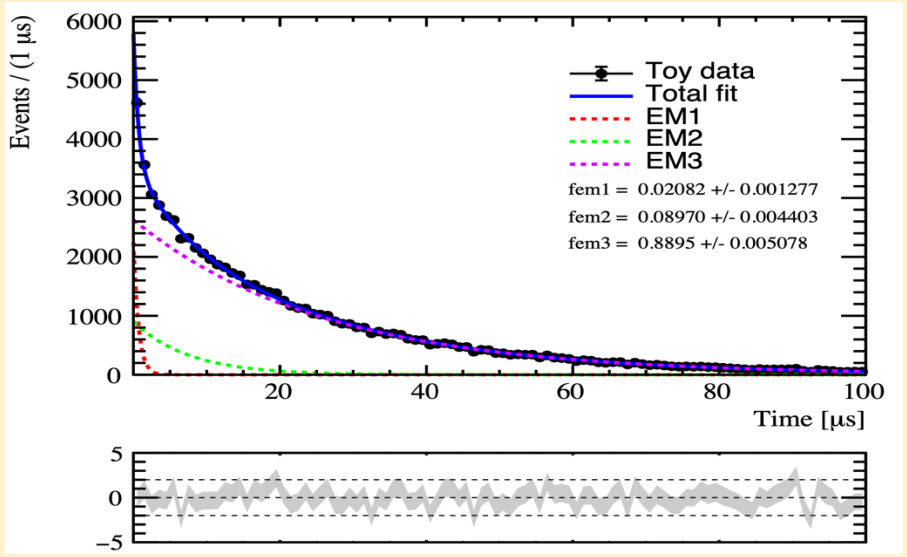


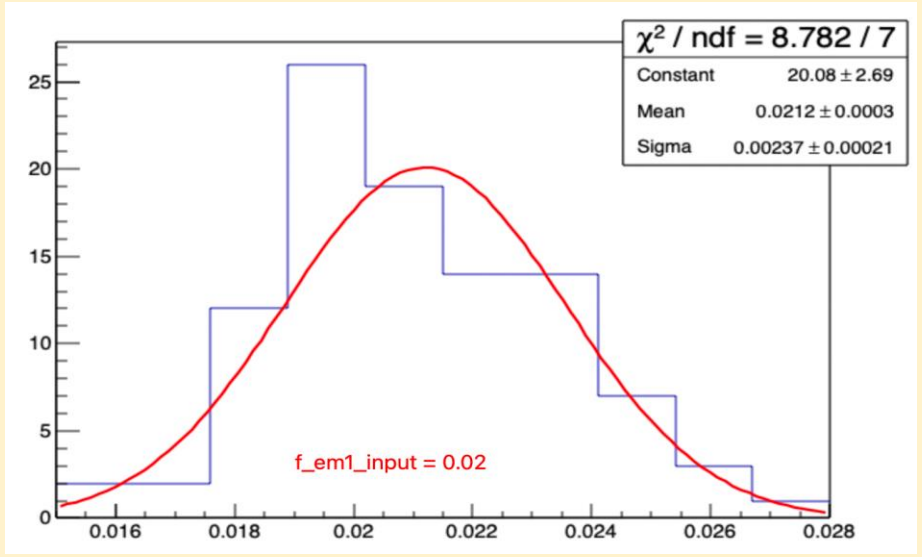


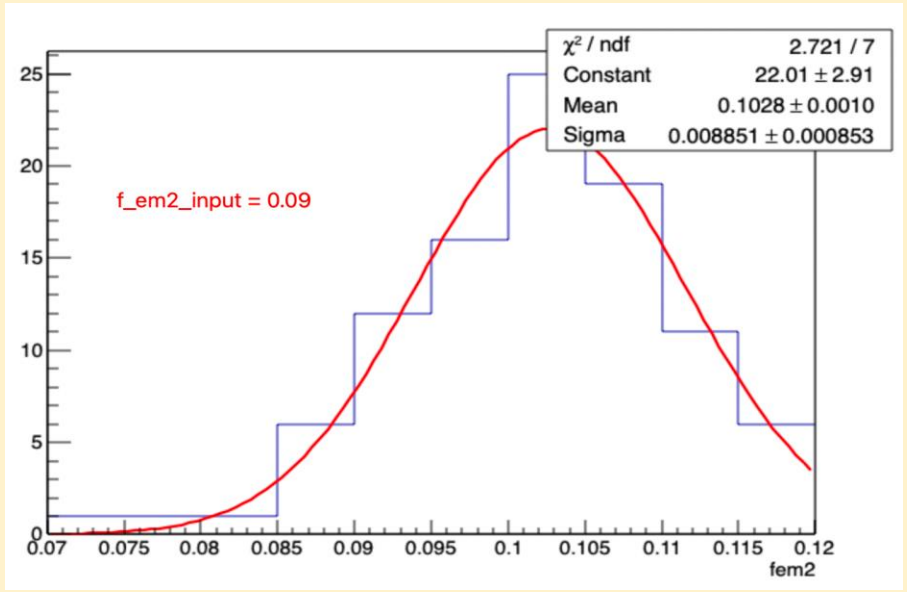


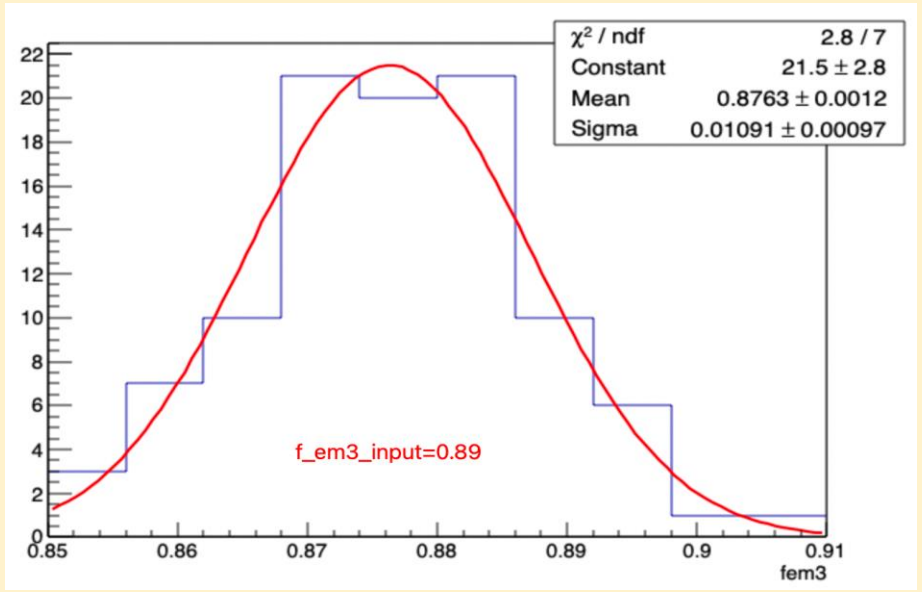


Fits to the EM energy (pi+)

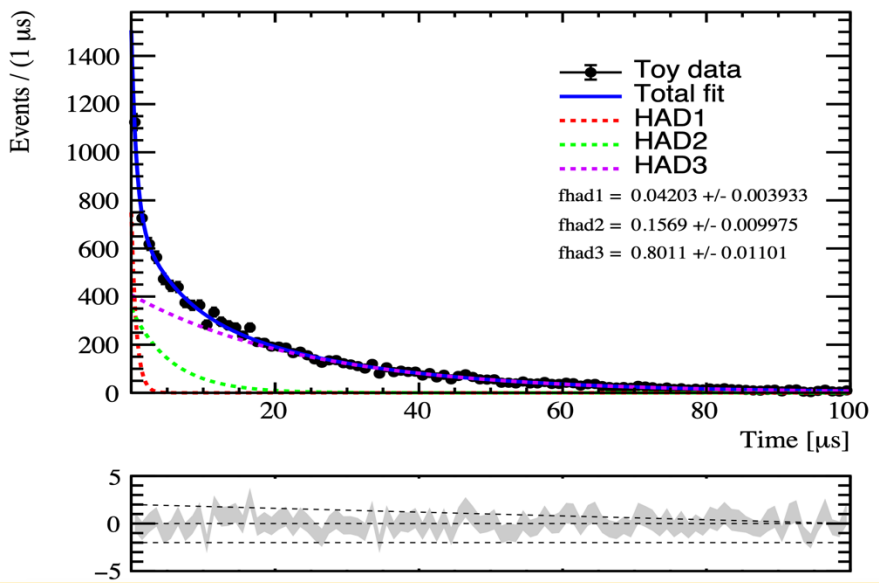


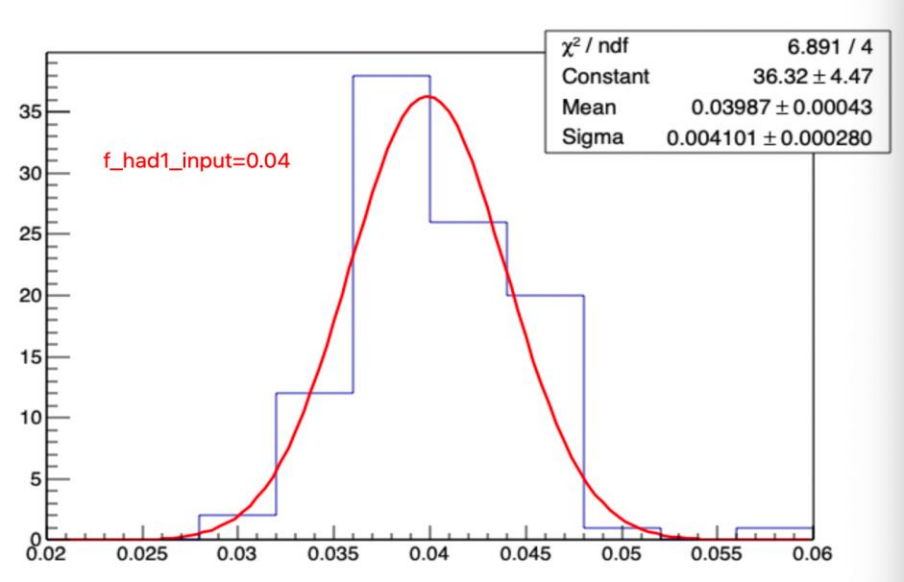


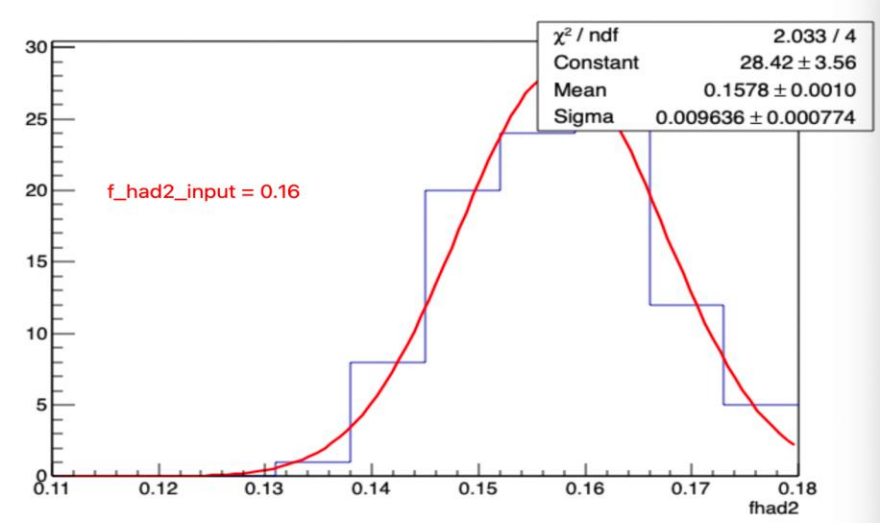


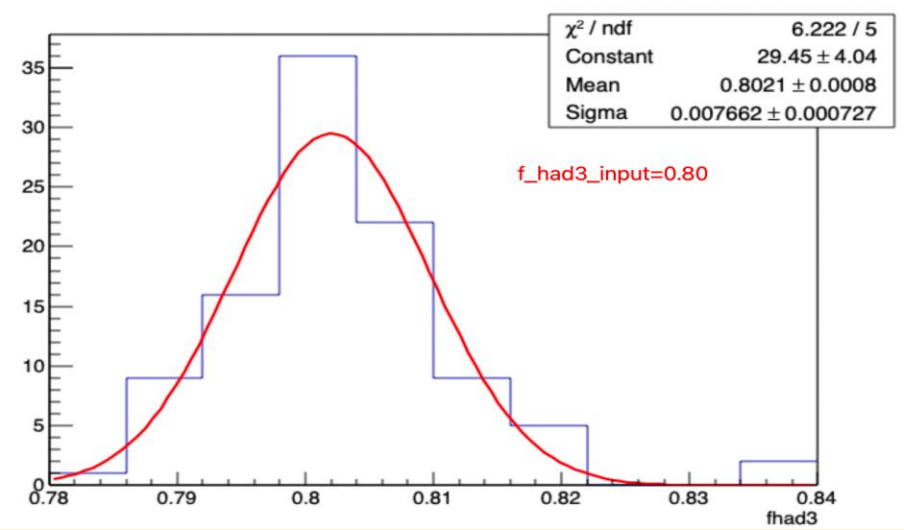


Fits to the hadron energy (pi+)

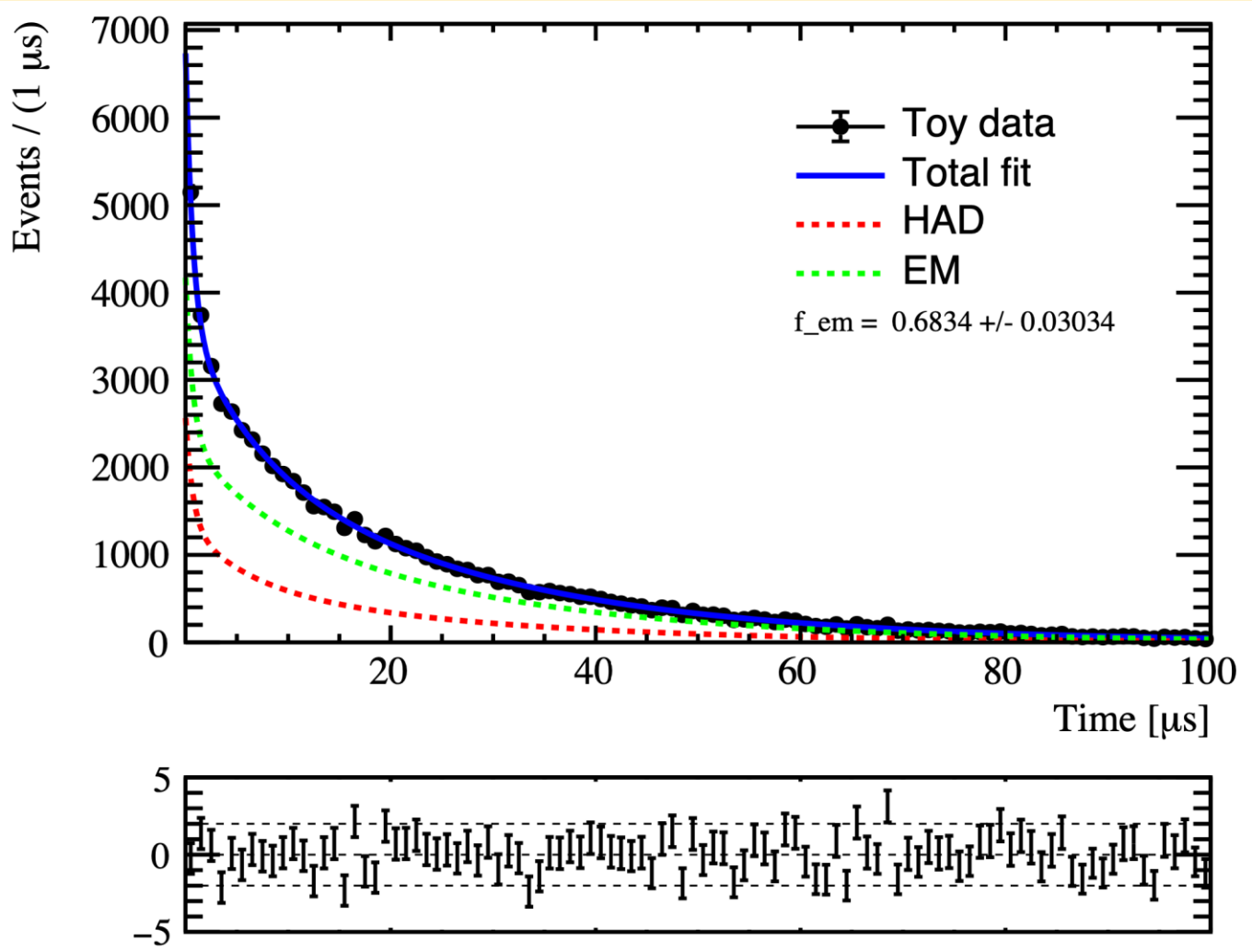






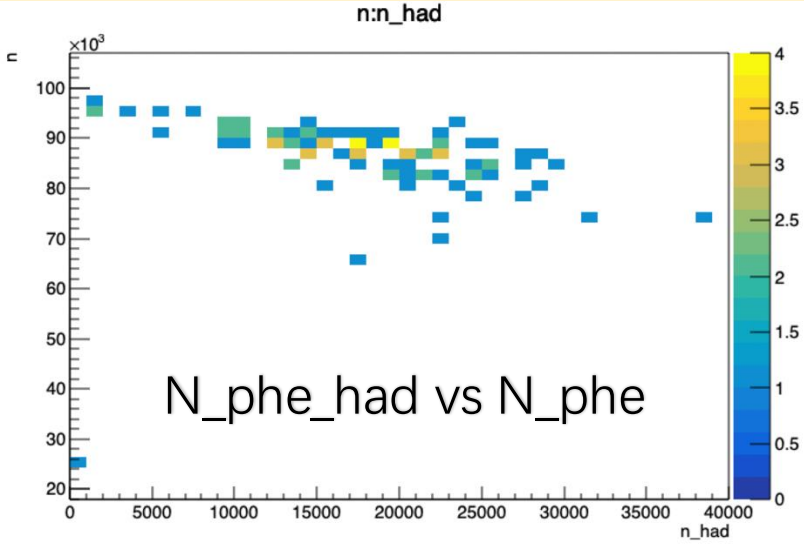


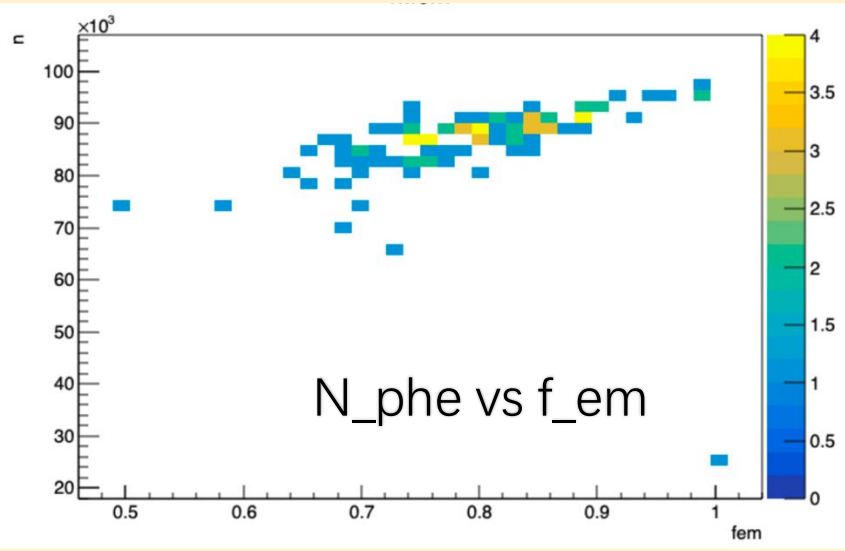
Fits to the EM fraction (pi+)

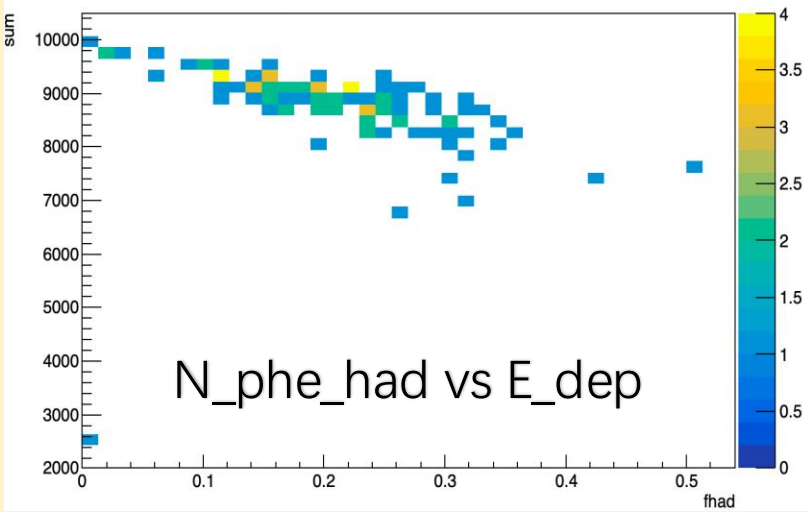


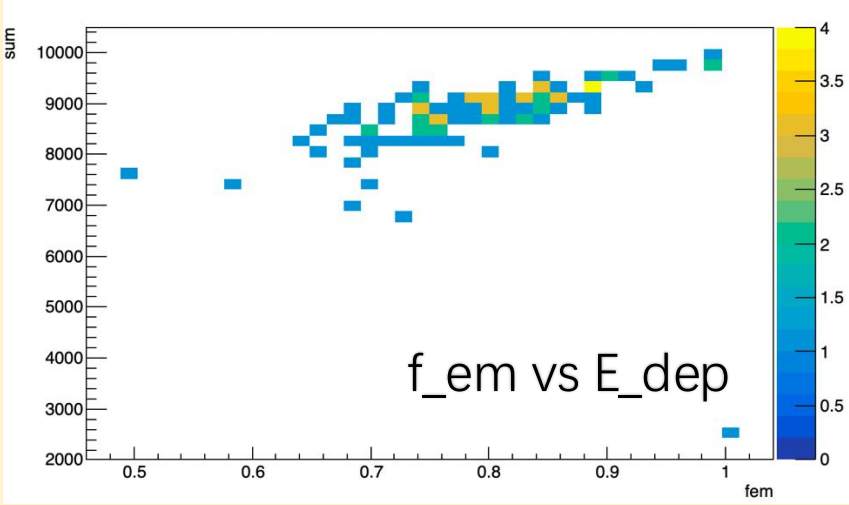
N_phe	69779
f_em	0.68(3)
f_had	0.32(3)
N_phe_EM	47690
N_phe_HAD	22089

The correlations









Single fit to the correlation E_dep vs f_em