# MC Energy Loss

- In **GEANT4**, energy loss of secondary particle is not added in default energy loss value.
  In **GEANT3**, energy loss for secondaries are added.

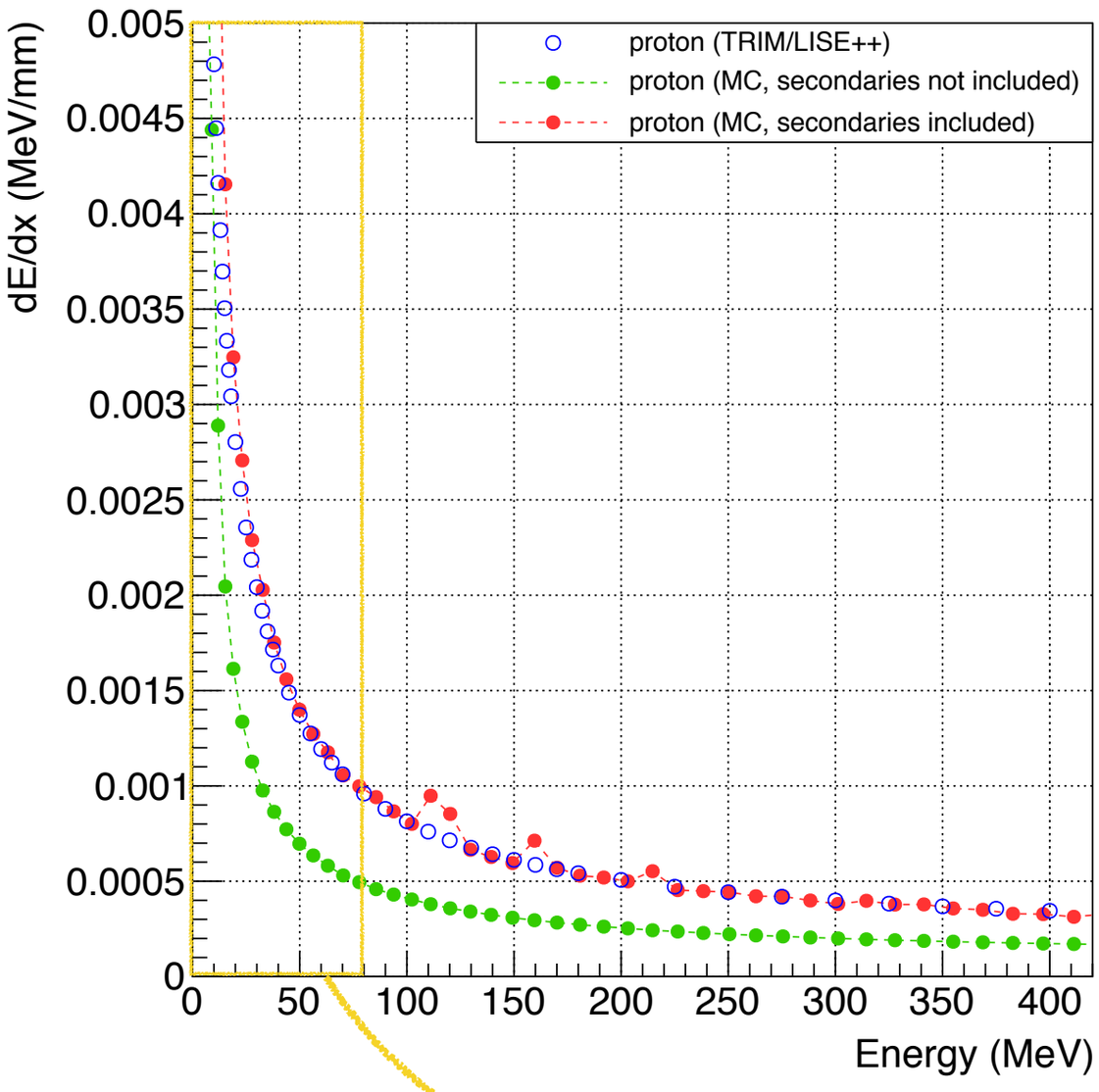
- If energy loss for secondary particles are added, the values agree with TRIM/LISE++ data, but not in low energy.

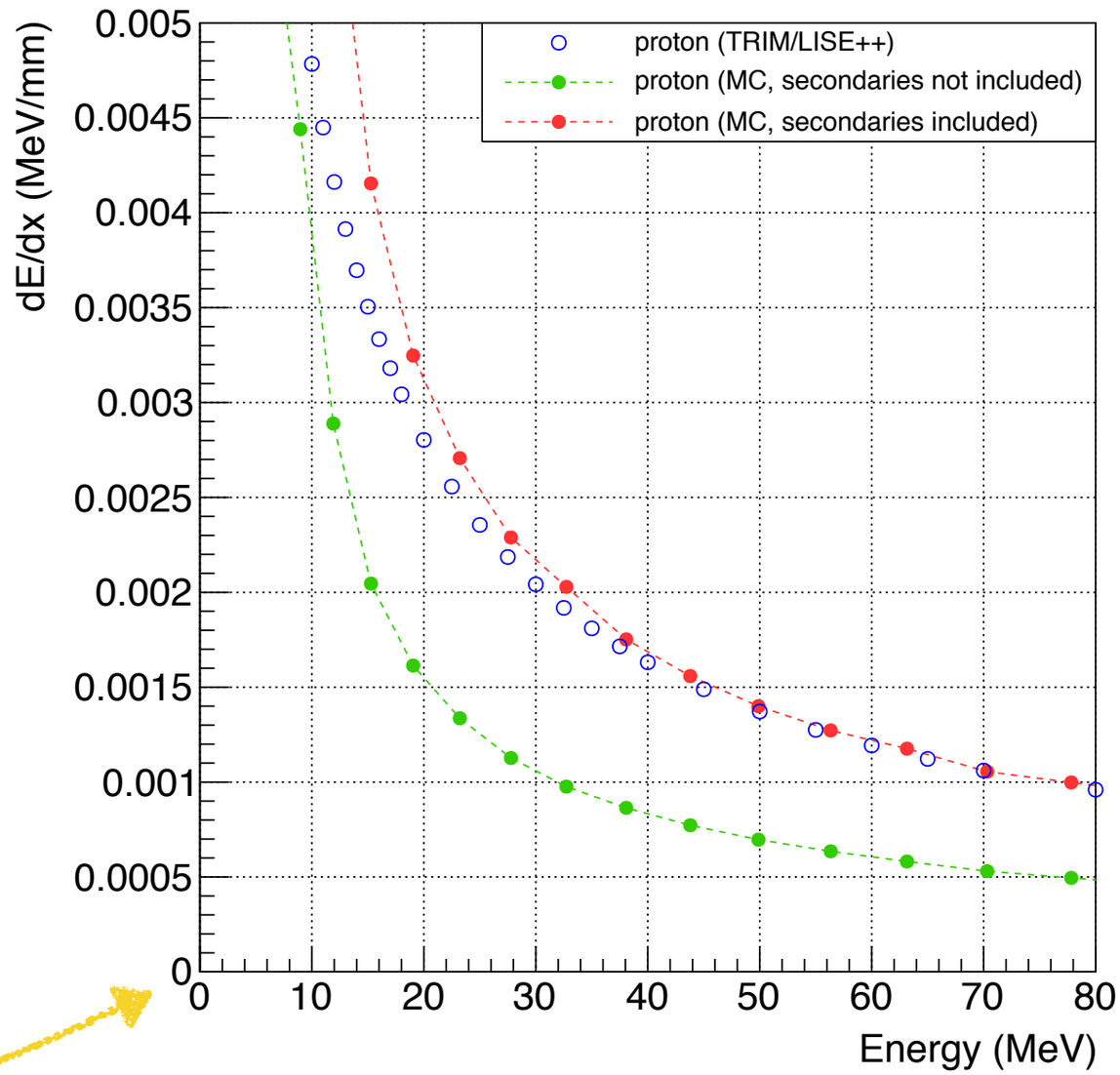
Low energy dosimetric applications

- 3 physics lists(QGSP_BERT_HP, **QGSP_BIC_HP**, FTFP_BERT) were tested but no big differences were shown.
  *reference of physics list :http://geant4.cern.ch/support/proc_mod_catalog/physics_lists/useCases.shtml

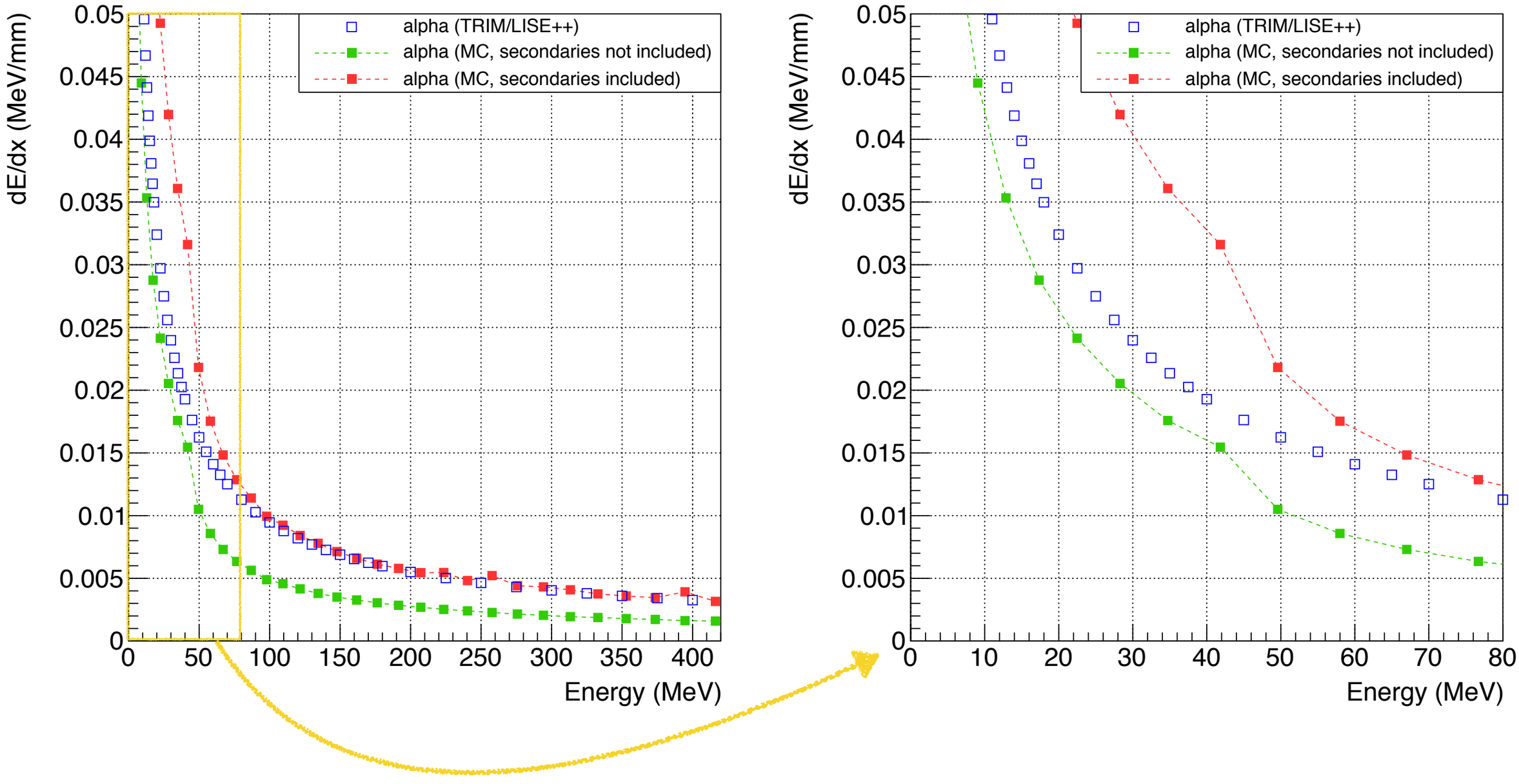
- Data for MC(GEANT4) are averaged over 100 events per each point.

# Proton Energy Loss

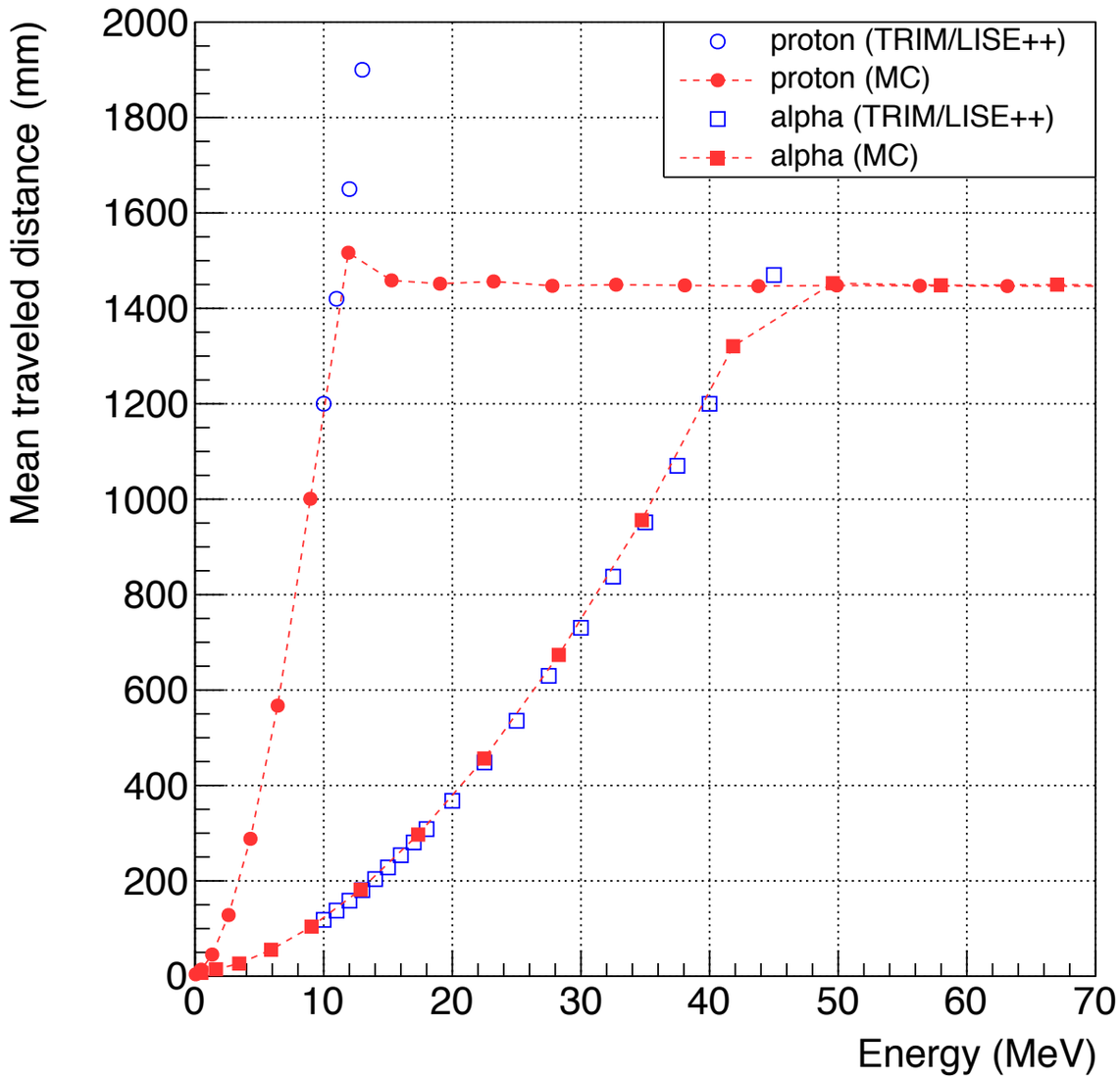


# Alpha Energy Loss

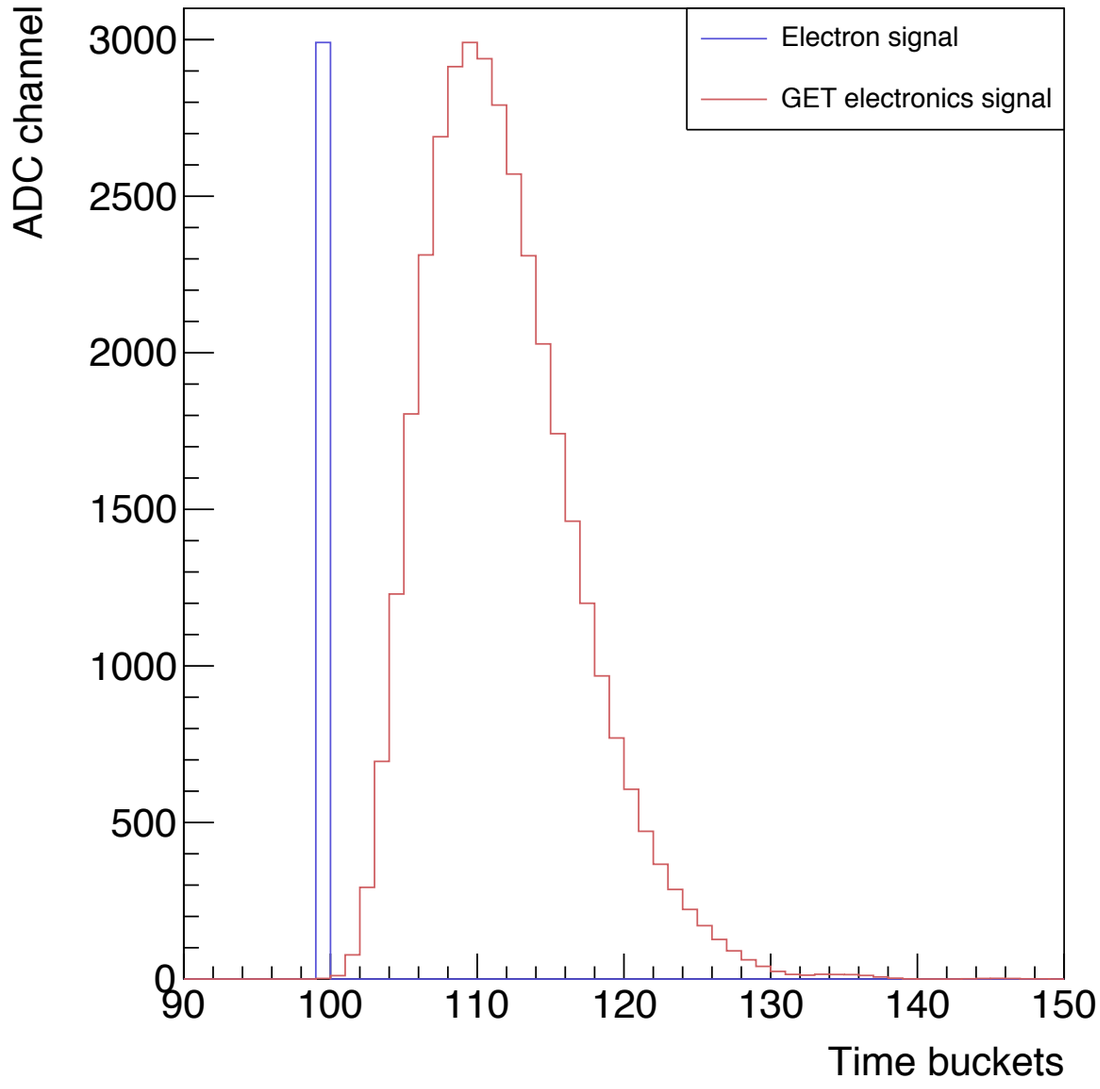


# Drift Length

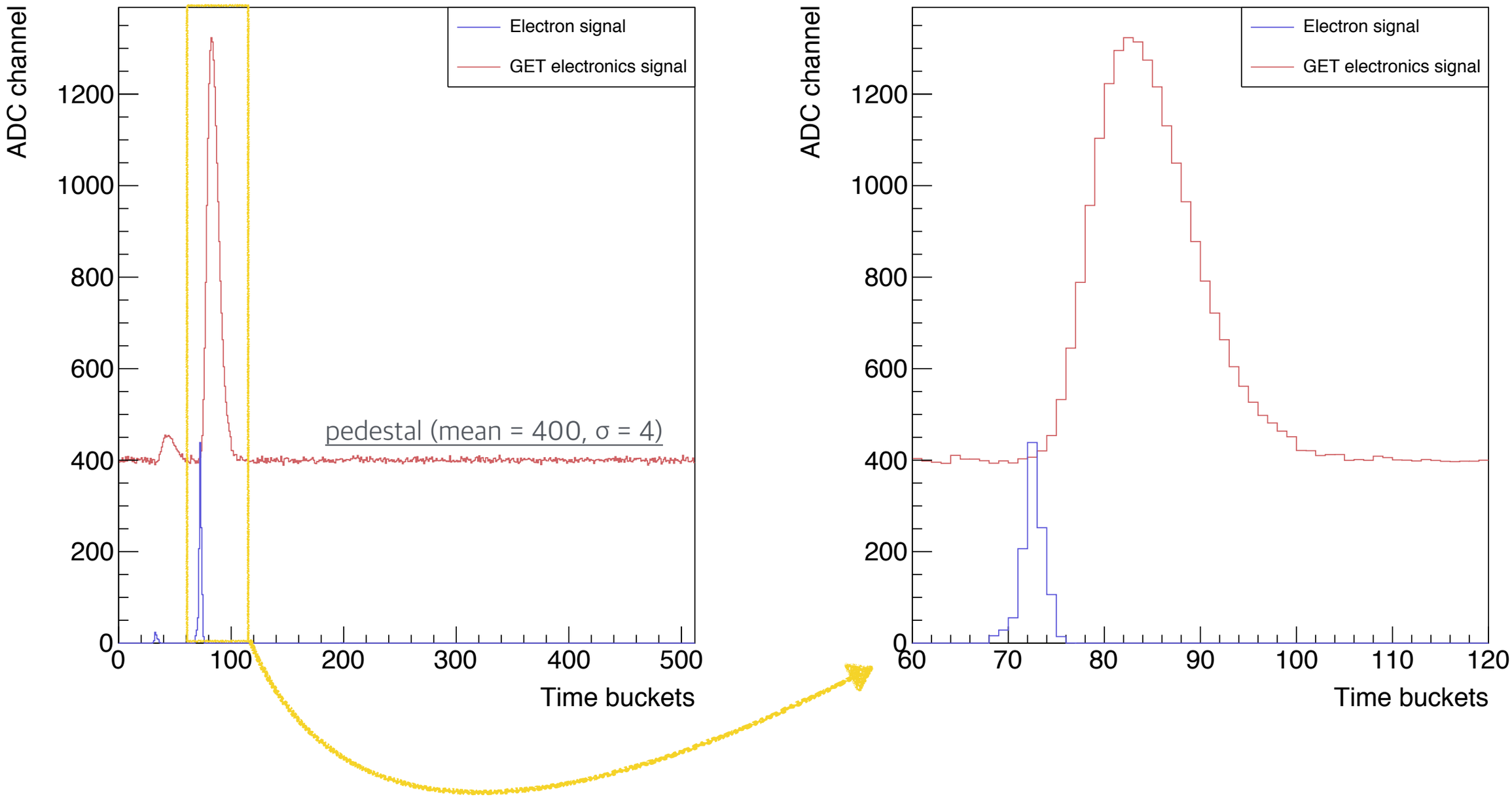


# Electronics Task

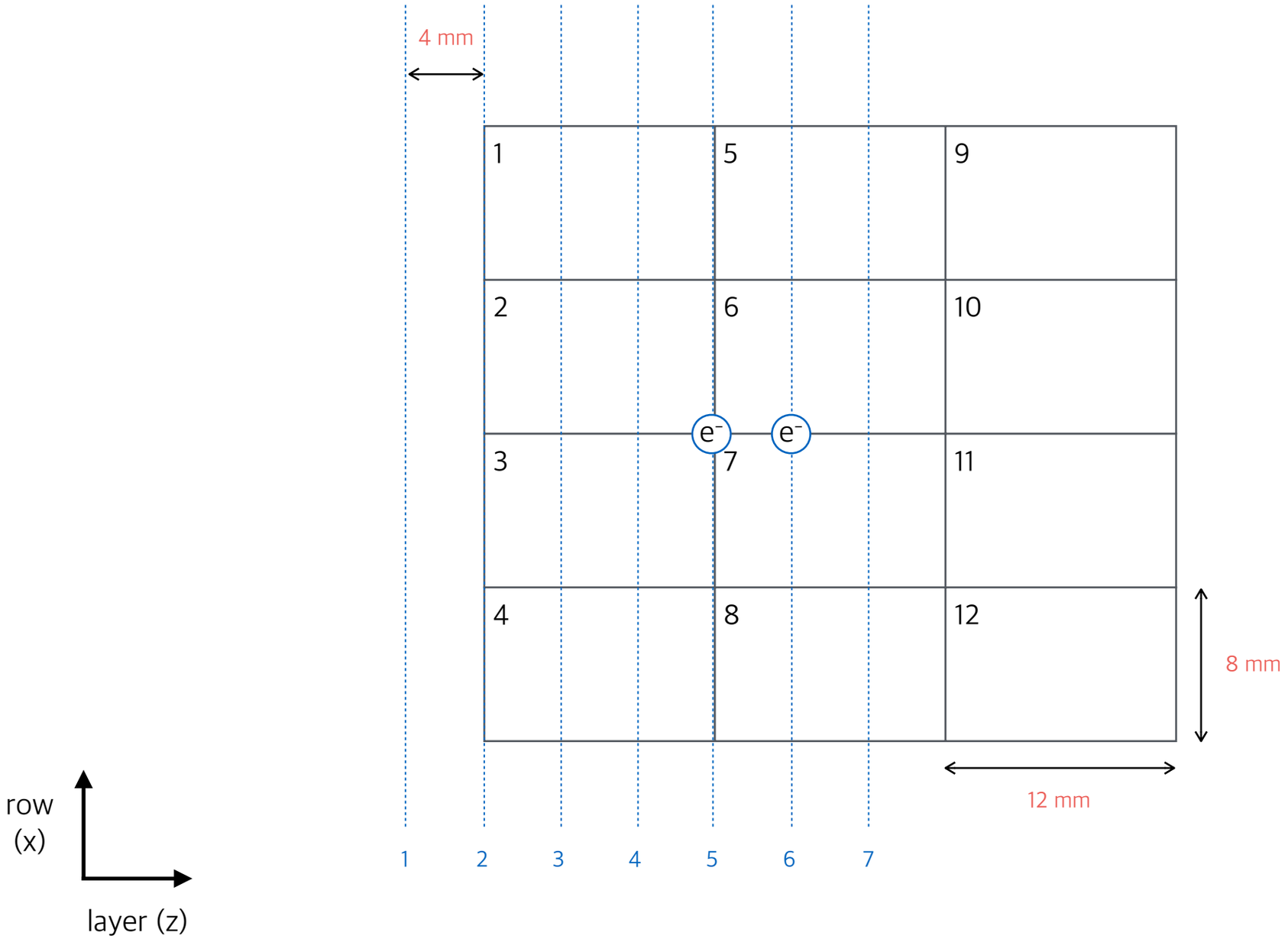
- **GET Electronics**
  - Dynamic range : 120 fC
  - 1 ADC channel = 0.0375 fC
  - 1 time bucket = 40 ns
- **Electronics Signal**
  - Signal shape is obtained from the pulser data of HIMAC test.
  - Height of the signal is proportional to incident charge.



# Electronics Task Simulation



# Pad Response



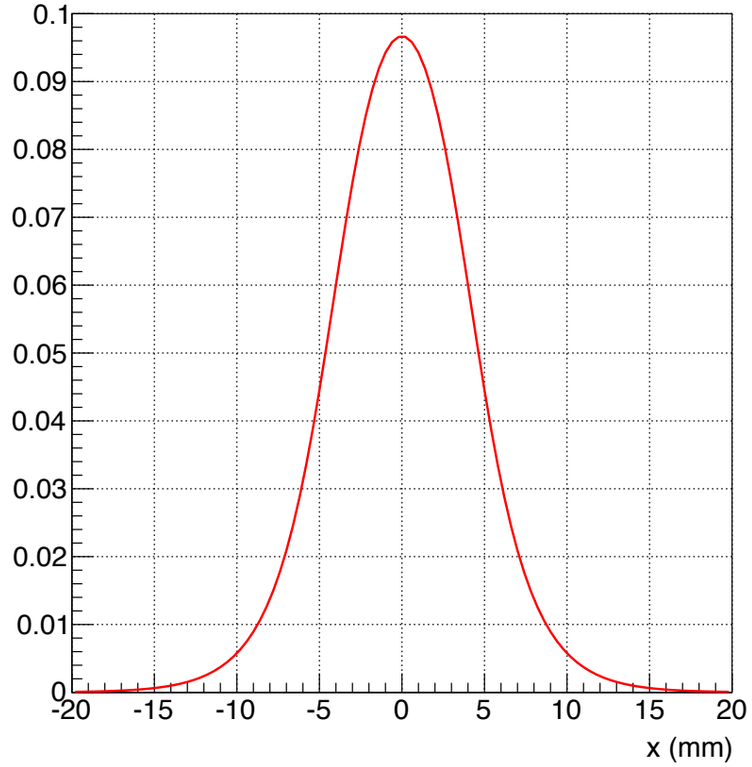
# Pad Response Function

$$P(\lambda) = \frac{K_1}{K_2\sqrt{K_3}}\left[\arctan\sqrt{K_3}\tanh\left(K_2\left(\lambda+\frac{w}{2h}\right)\right) - \arctan\sqrt{K_3}\tanh\left(K_2\left(\lambda-\frac{w}{2h}\right)\right)\right]$$

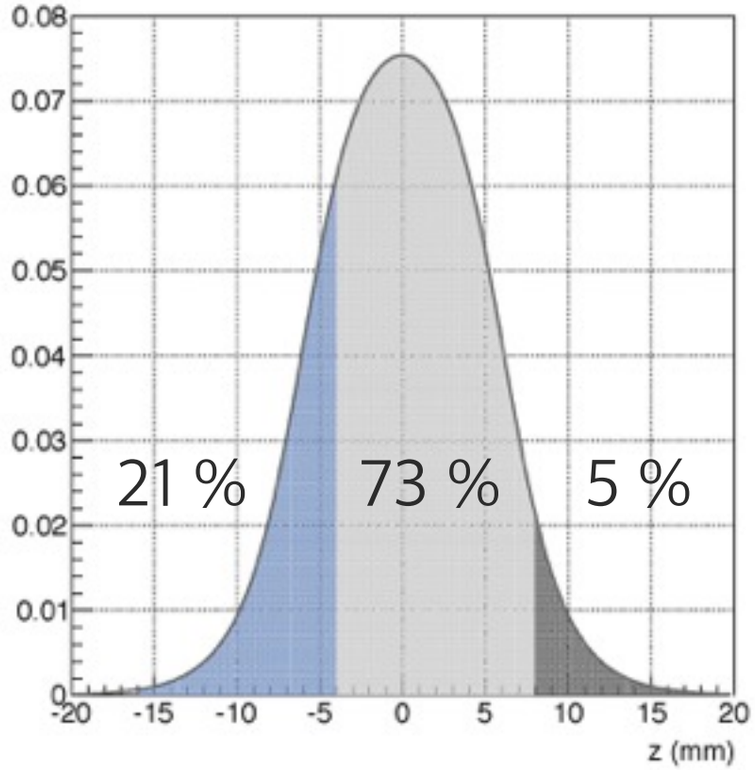
using **Gatti distribution**

λ = x/h
x : distance from the center of avalanche
h : distance from anode wire plane to cathode pad plane
w : width of pad
$K_n$ : constants related to geometry

Row (w= 8mm)




Layer (w=12 mm)




* Calculation of a semi-empirical cathode charge distribution for SπRIT – William Powell