The Detector Efficiency and Pad Mulitiplicity in Prototype Simulation (III)

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Outline

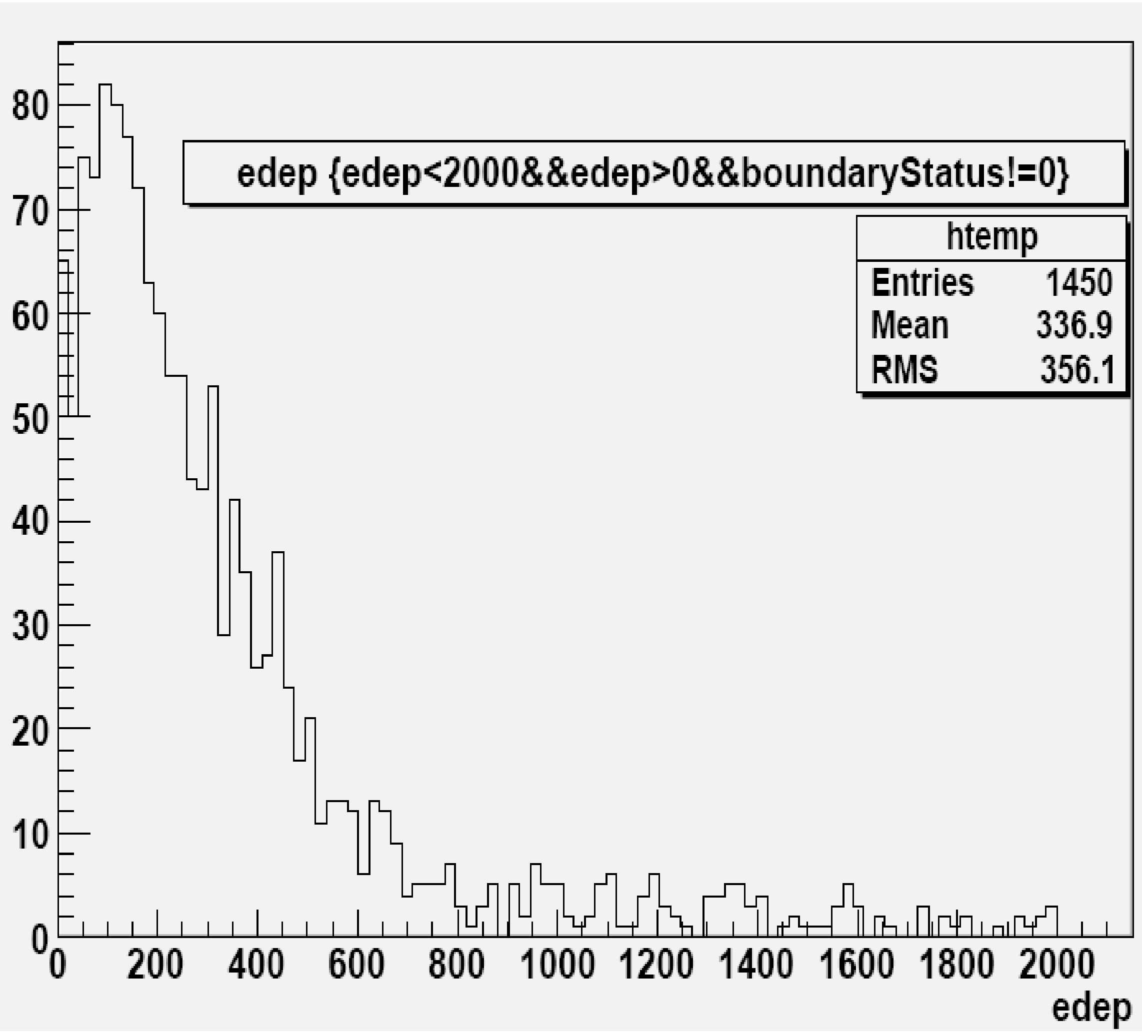
- Redo Digitization (the deposited energy, the fitting function, the mean charge per Ion)
- Compare efficiency between data and simulation
- Compare pad multiplicity between data and simulation

The way to digitization (from Manqi's slide)

Method

- Get the true energy deposition in gas gap from MC (eg, Mokka)
- Express the true energy deposition in unit of primary ionization (E_{truth}/E_{ion}): calculate the number of ionization
- For each ionization, we use Polya function ($P(m) = \frac{m(mG/G_0)^{m-1}}{\Gamma(m)} \cdot e^{-mG/G_0}$) to estimate the corresponding charge inducing
- Sum induced charge over every ionization ~ total induced Charge

Step1: Deposited Energy @gas gap(G4MC)



Structure of prototype

Only 1 layer

No absorb

Incoming beam

1GeV muons

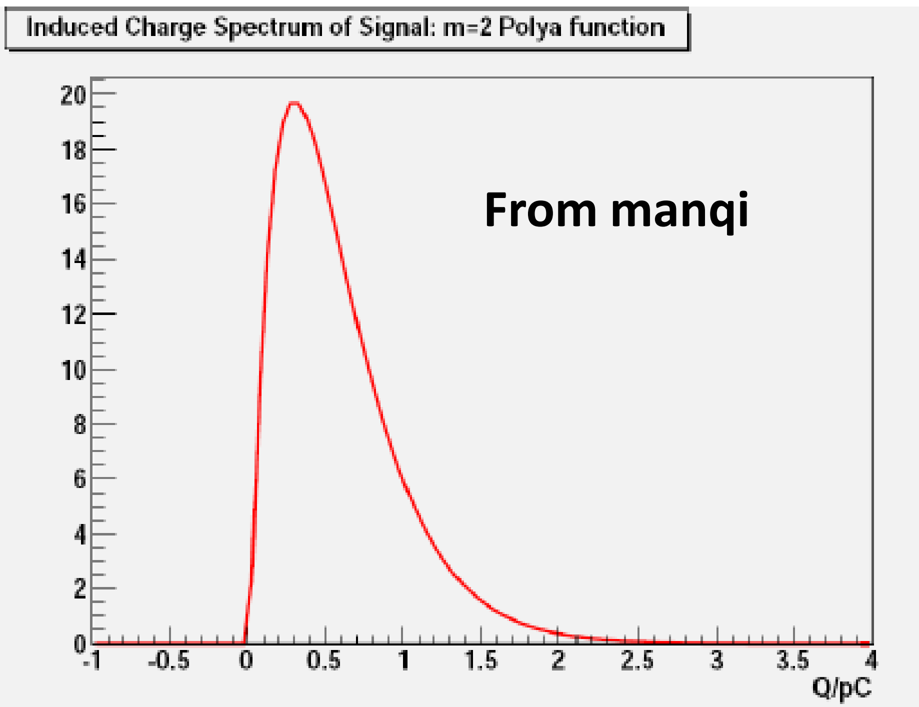
Cuts selection

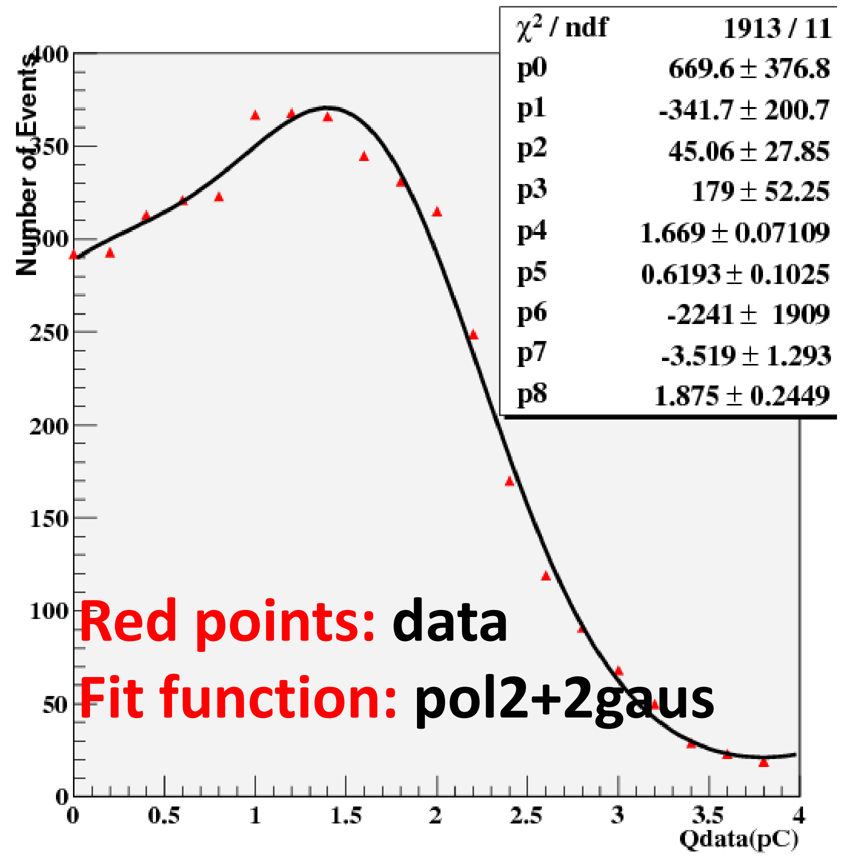
muloni and eloni process

Boundarystatus!=0

Step2:Function to estimate the induced charge

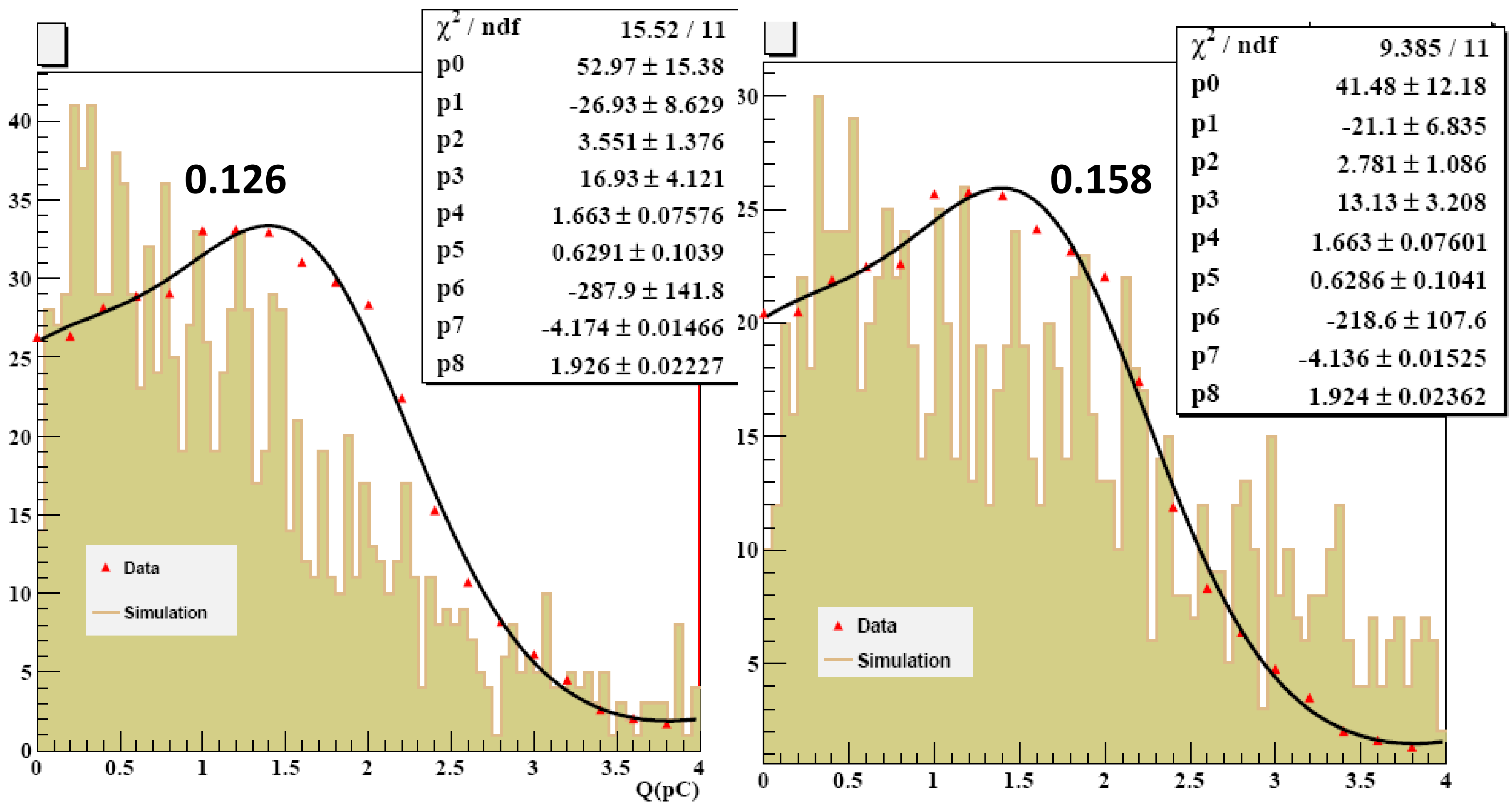
- Function changed from Polya to pol2+gaus



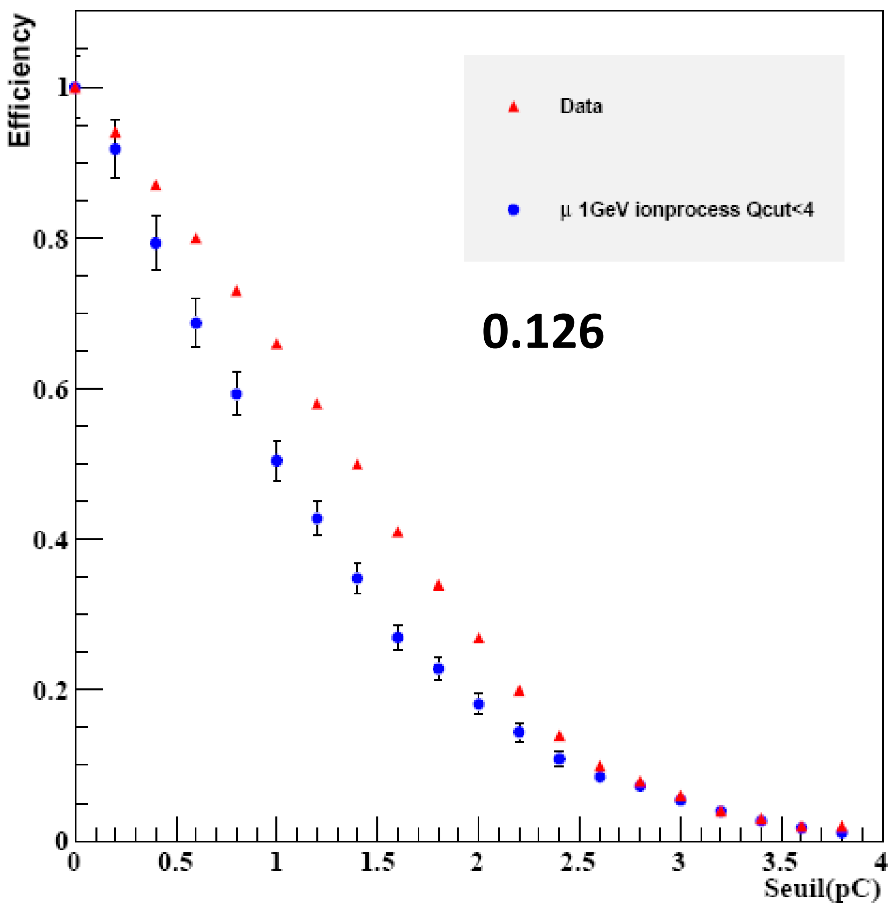


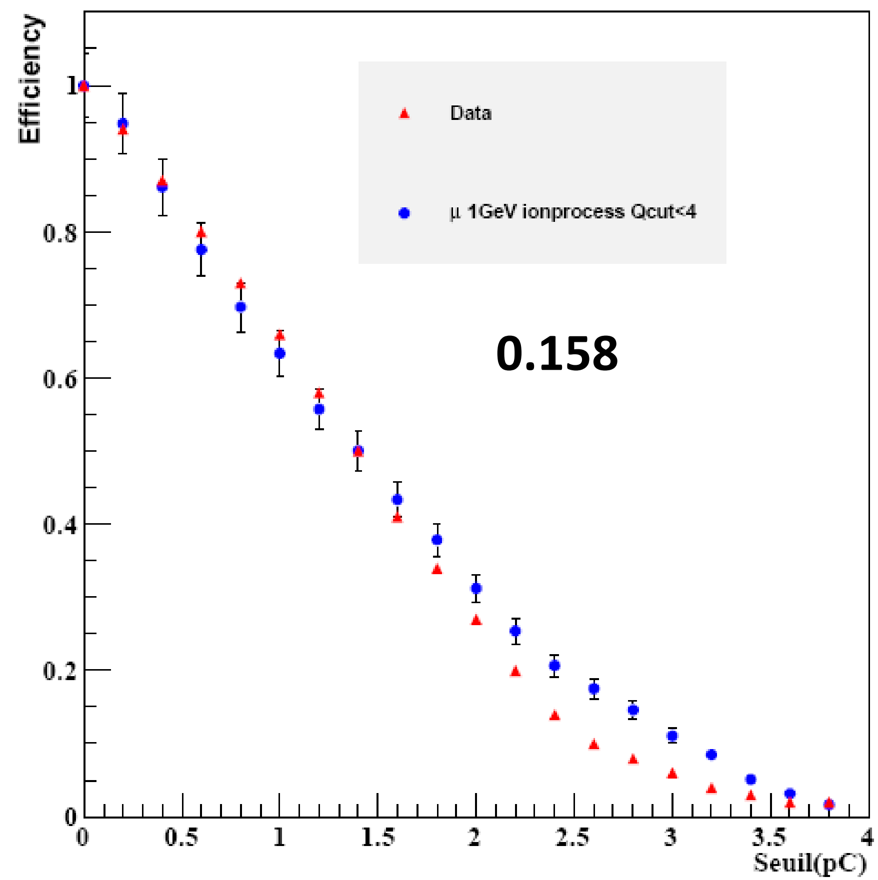
Step3: Mean charge per ion

- change the mean charge per ion from 0.126 to 0.158 according to the shape of induced charge distribution

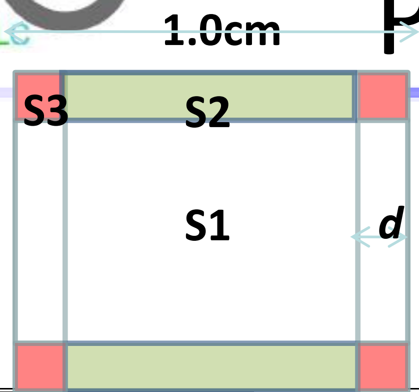


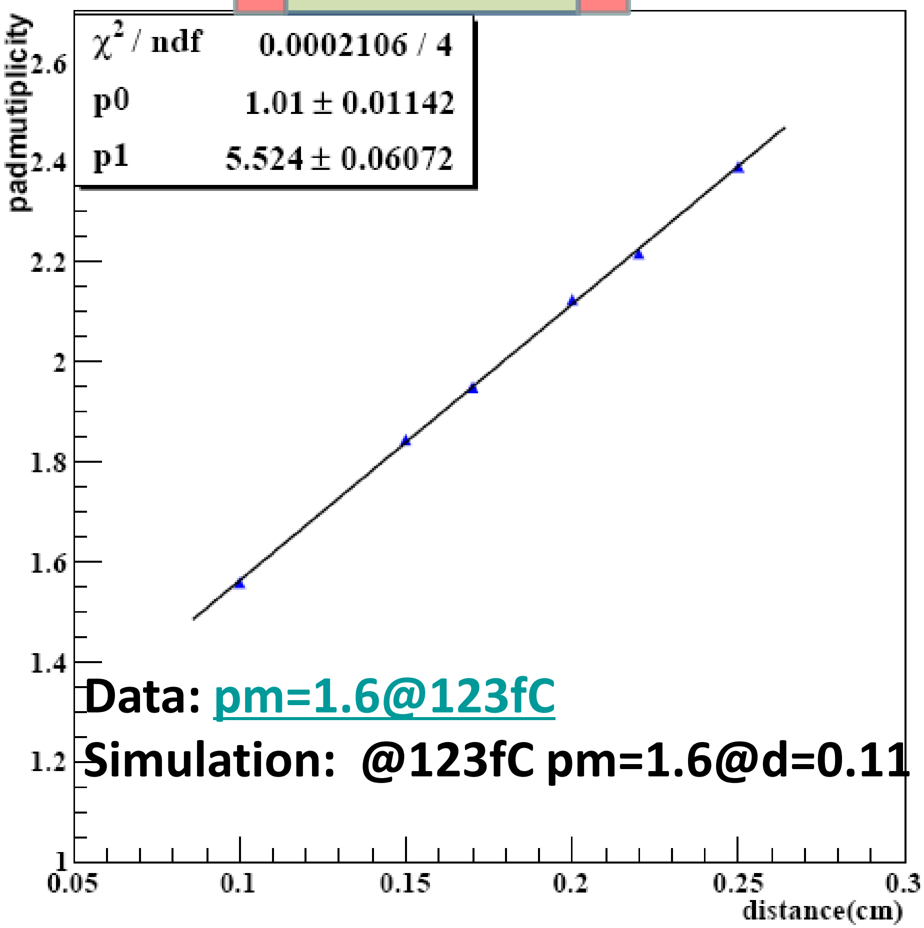
Efficiency Results





Pad Multiplicity Results

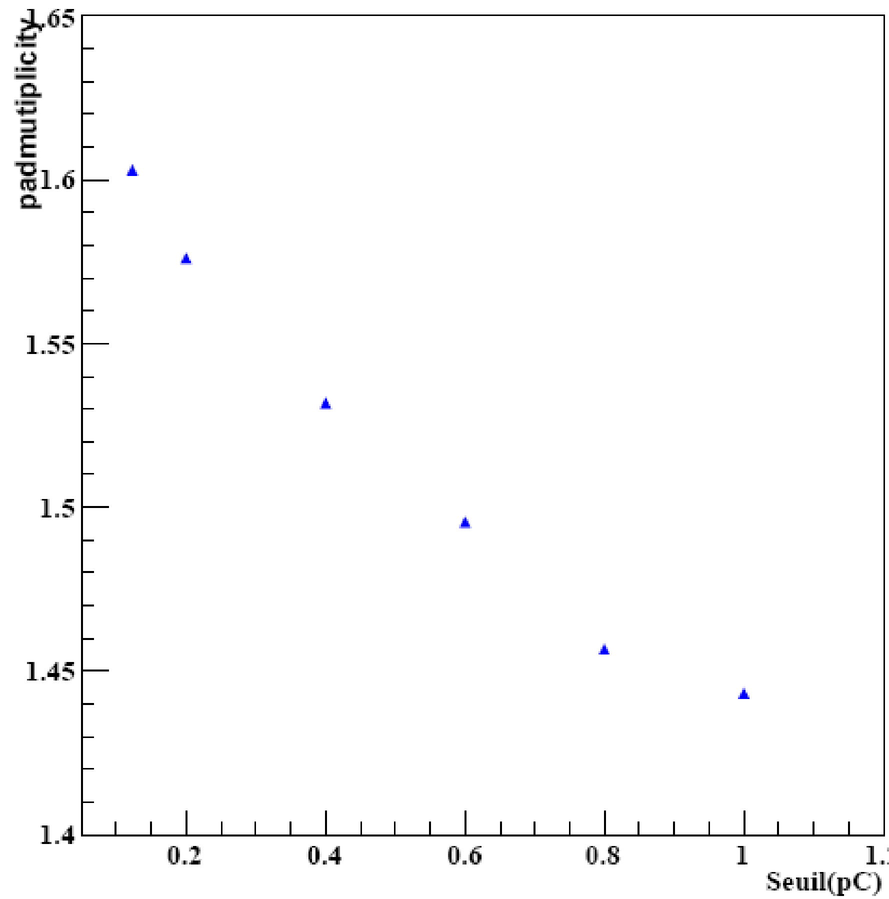




Data: pm=1.6@123fC

Simulation: @123fC pm=1.6@d=0.11

Simulation: pm at different threshold when d=0.11



Next Step

- Take a look at avalanche mode to see what we can do
- Use big RPC prototype to do Q distribution again from data