

Shower test beam data

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Data used

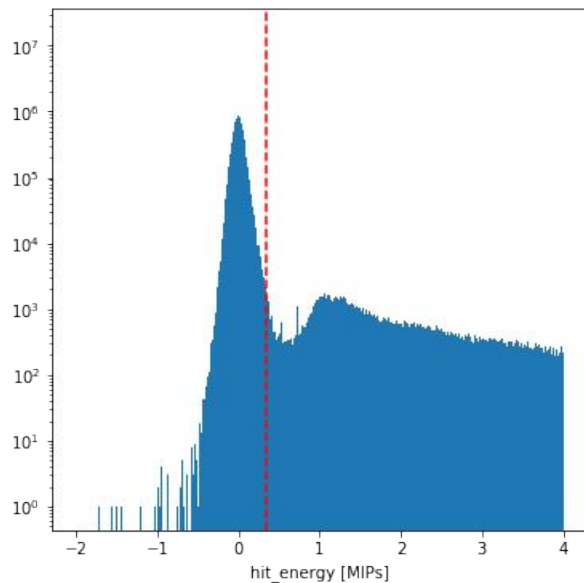
- Located in:

TB2017-06/DESY/ConvertedData/pass3/Tungsten/**conf{1,2,3}**/grid20/{**1, 2, 3, 4, 5, 5.8**}GeV_build.root

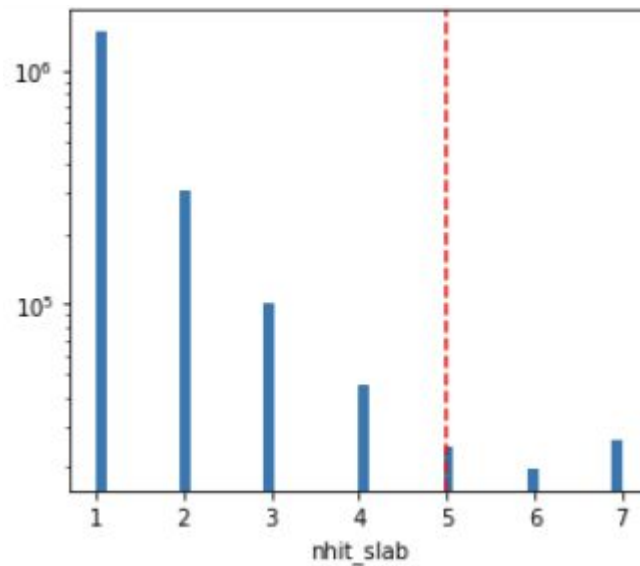
- Usually two trees (e.g.: 'ecal;29', 'ecal;28') → use the one with largest cycle?
- Tungsten configurations:
 - W-configuration 1: 0.6, 1.2, 1.8, 2.4, 3.6, 4.8 and 6.6 X_0
 - W-configuration 2: 1.2, 1.8, 2.4, 3.6, 4.8, 6.6 and 8.4 X_0
 - W-configuration 3: 1.8, 2.4, 3.6, 4.8, 6.6, 8.4 and 10.2 X_0

Selection

- Cut hits below $\mu + 5\sigma$ of (gaussian) hit_energy noise



- Reject events where slab hits ≤ 5

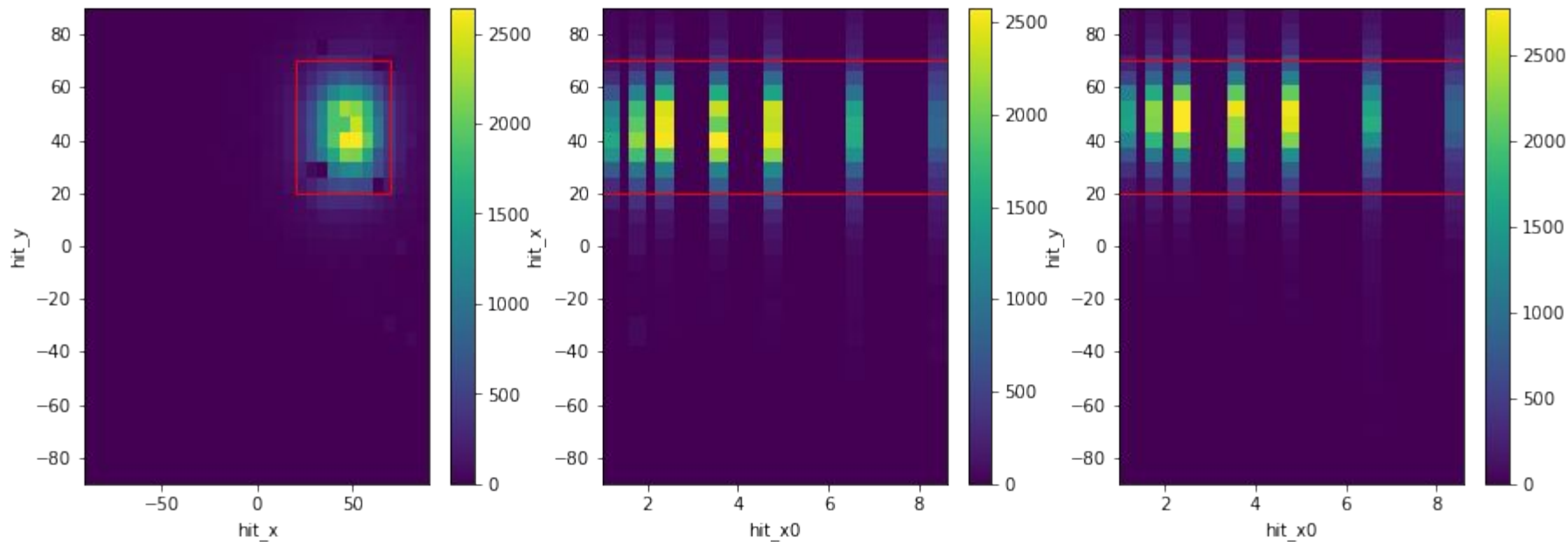


Selection

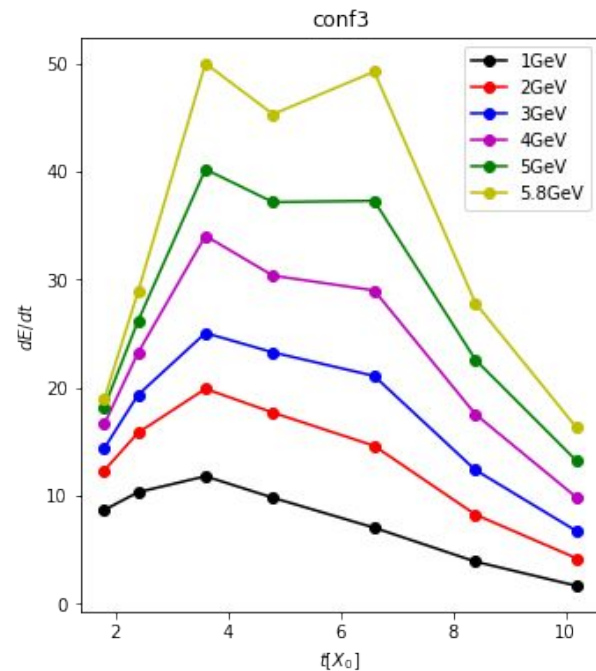
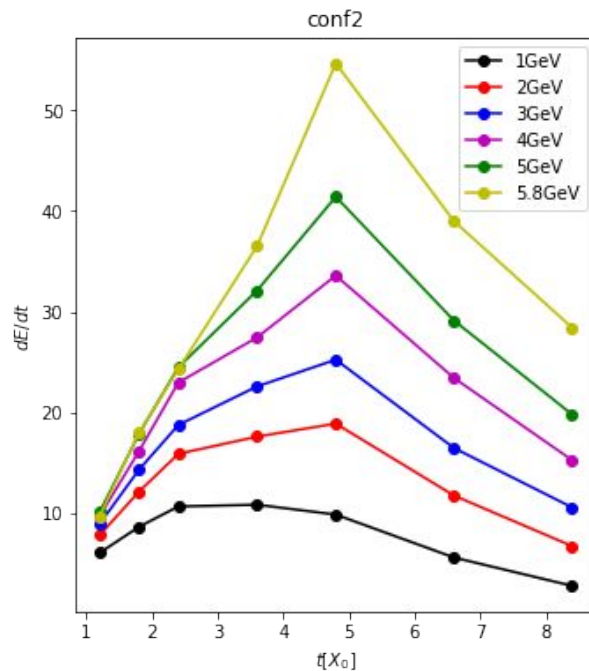
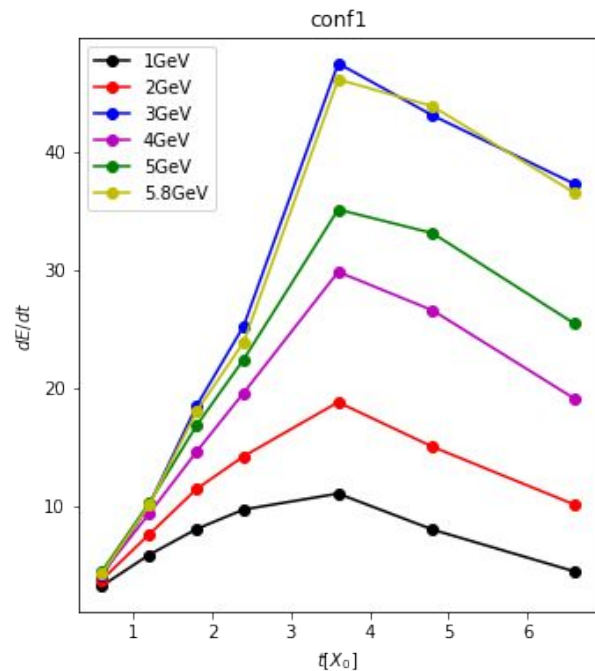
Hit maps for the sum of all showers (conf2, 1GeV):

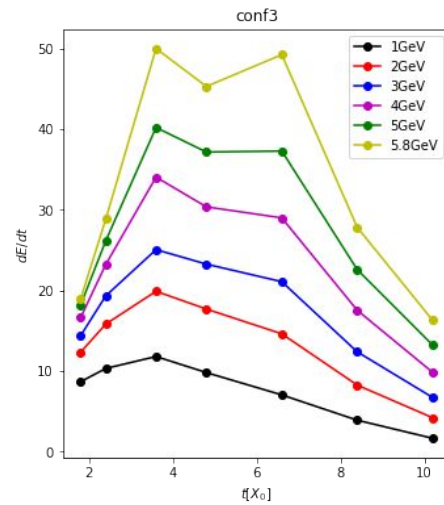
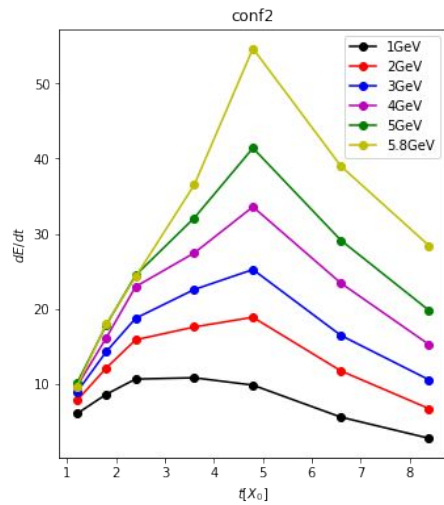
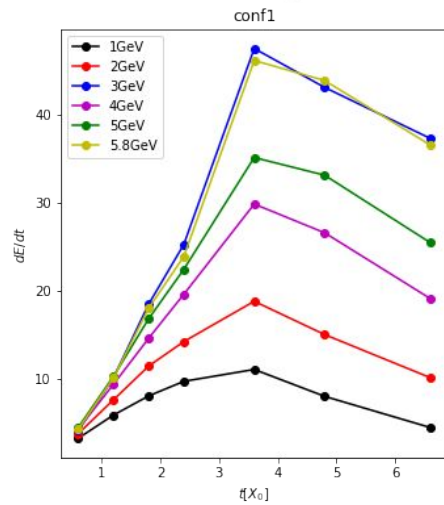
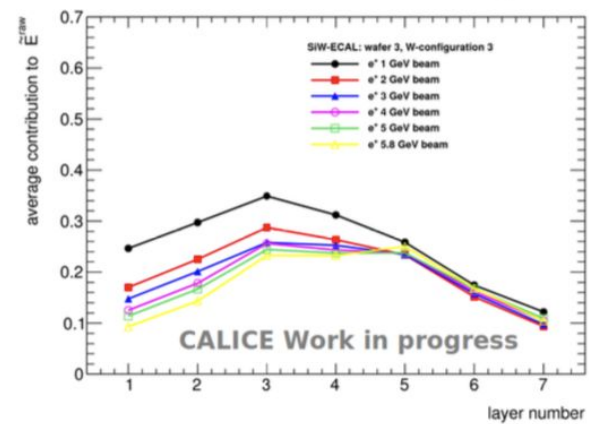
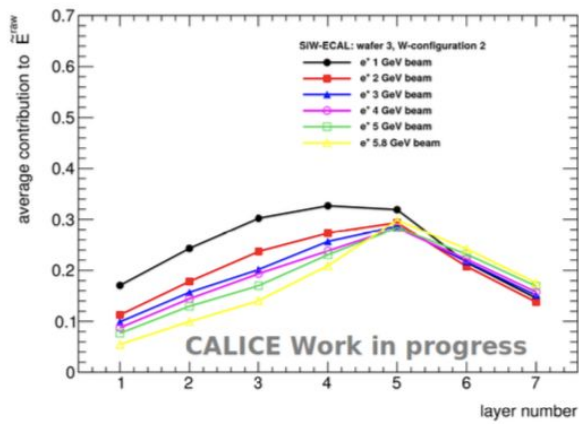
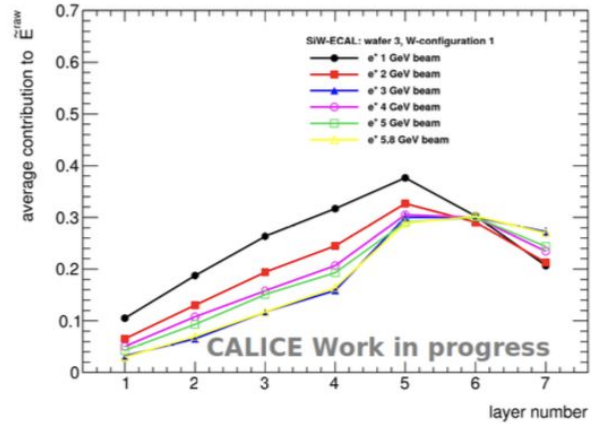
→ At the moment: cut on [20, 70] in $\text{hit}_{\{x,y\}}$, but need to automate this

Hit maps



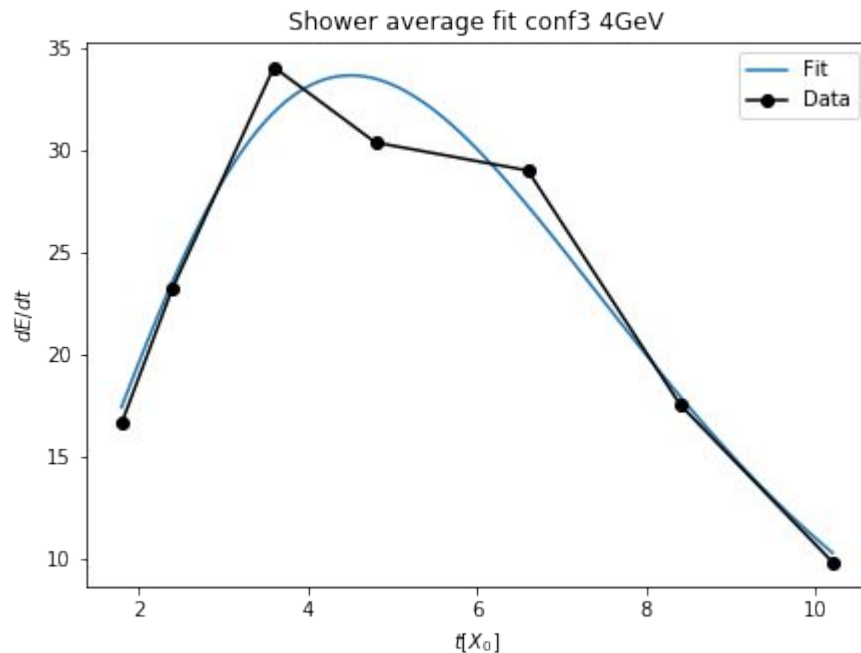
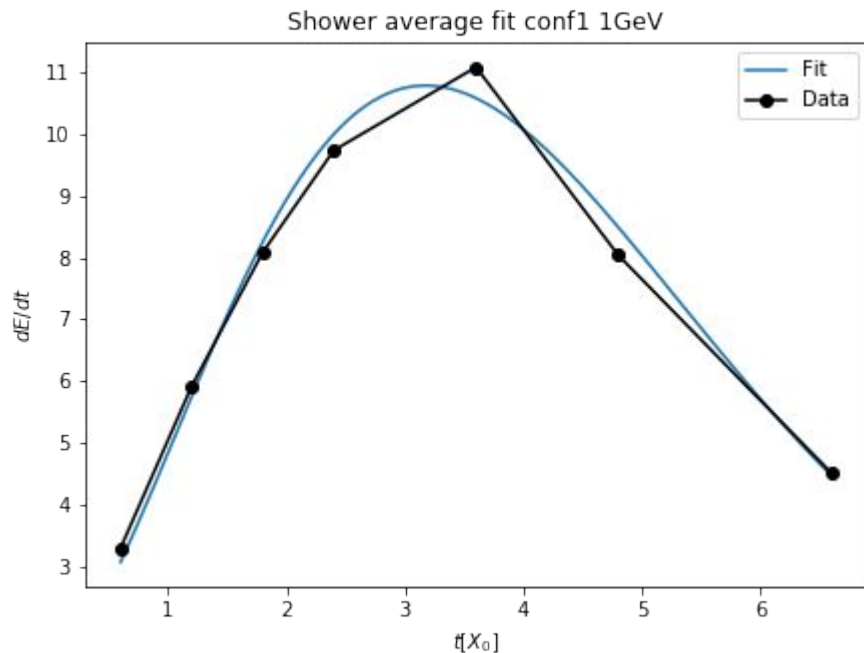
Average energy per layer





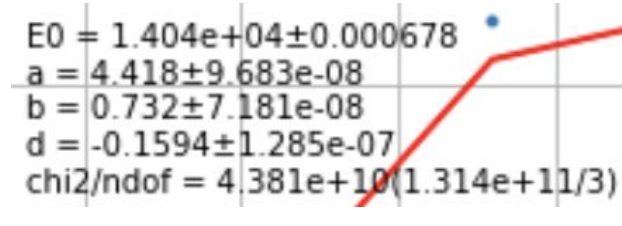
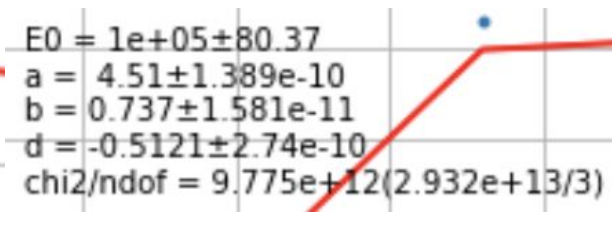
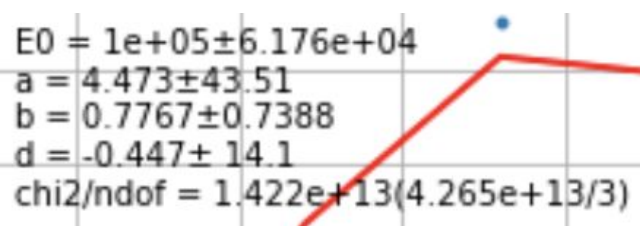
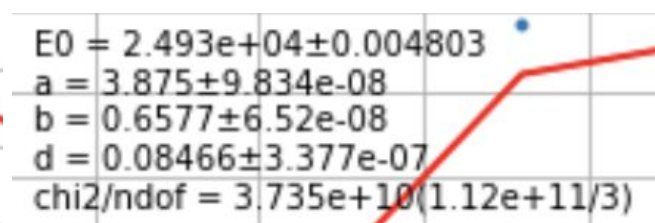
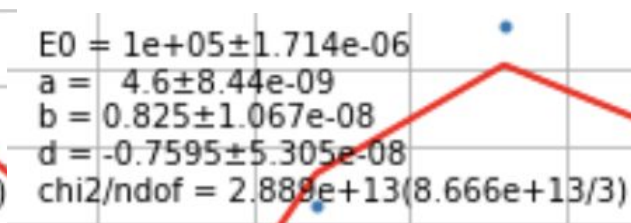
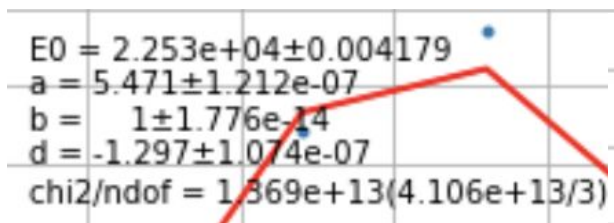
Fitting average energy

$$\frac{dE}{dt} = E_0 b \frac{(bt)^{a-1} e^{-bt}}{\Gamma(a)}$$



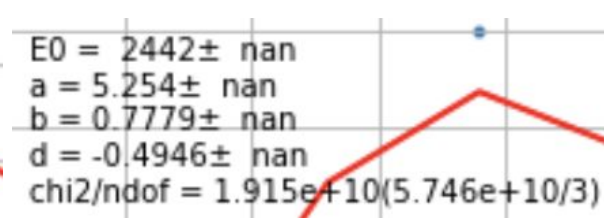
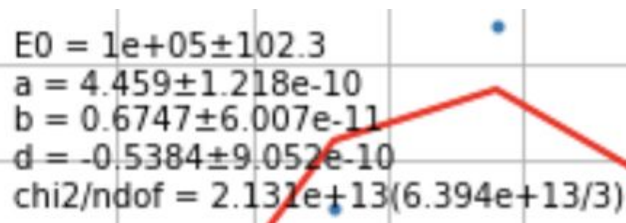
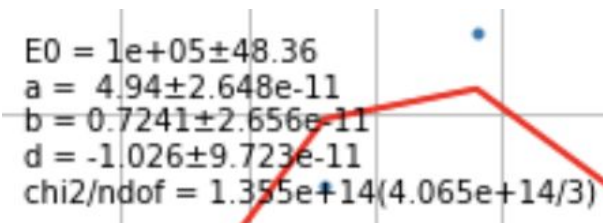
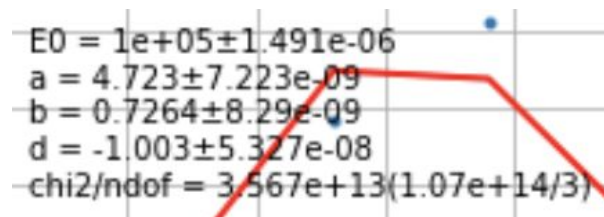
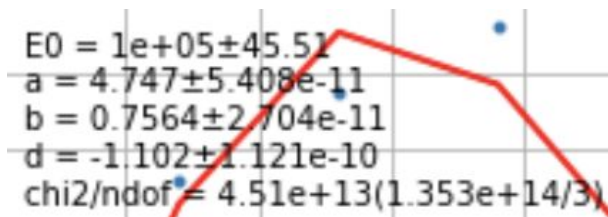
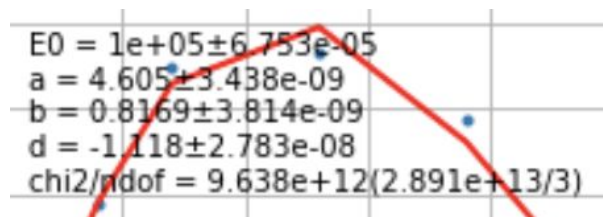
Fit results conf1 - 1, 2, 3 // 4, 5, 5.8 GeV

(E0 normalization to be fixed)



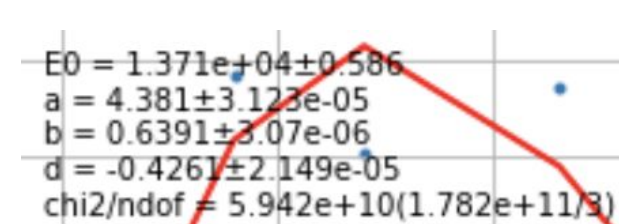
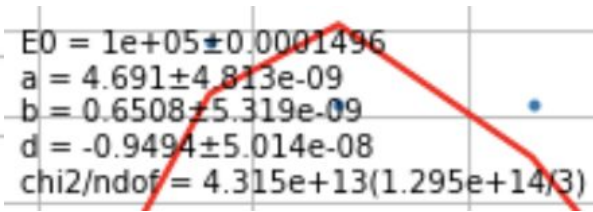
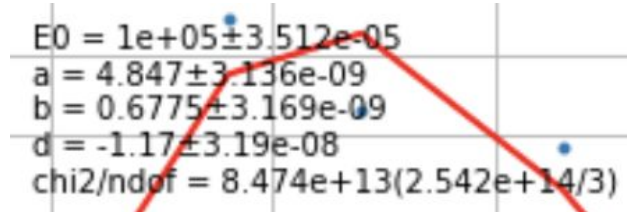
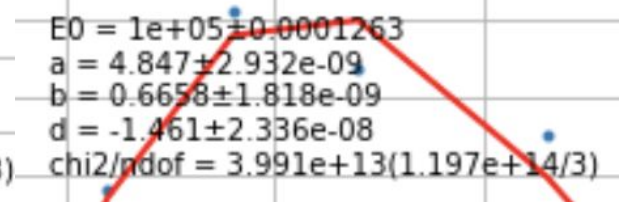
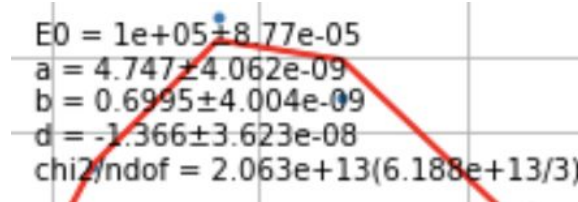
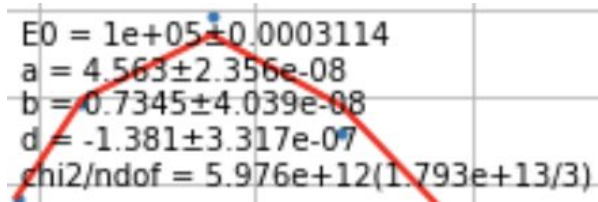
Fit results conf2 - 1, 2, 3 // 4, 5, 5.8 GeV

(E0 normalization to be fixed)

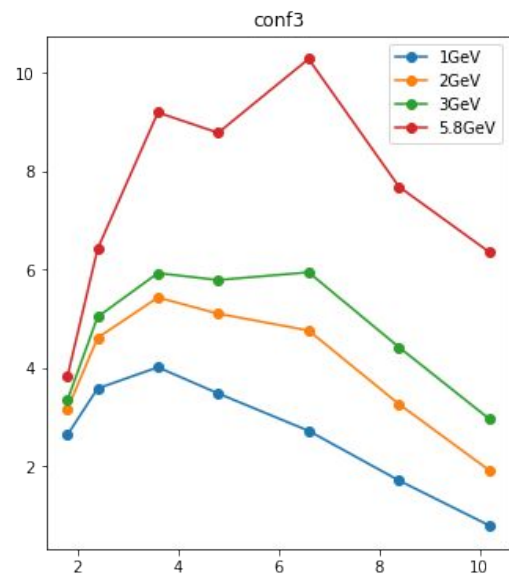
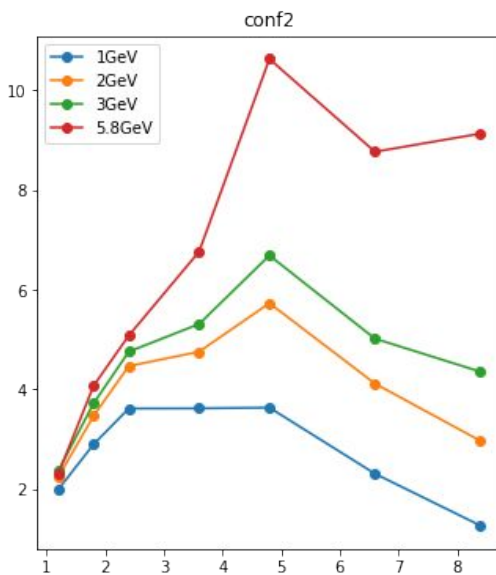
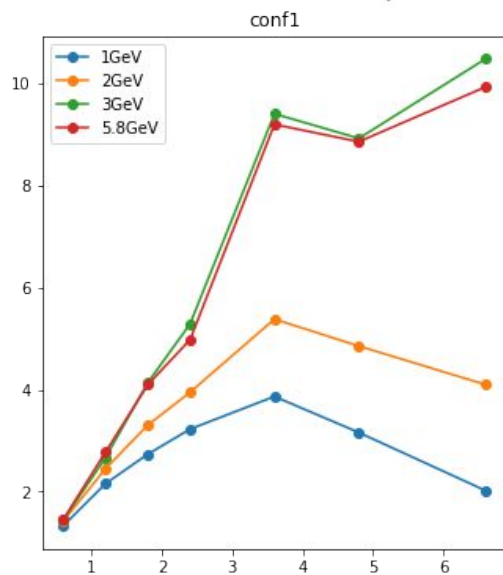
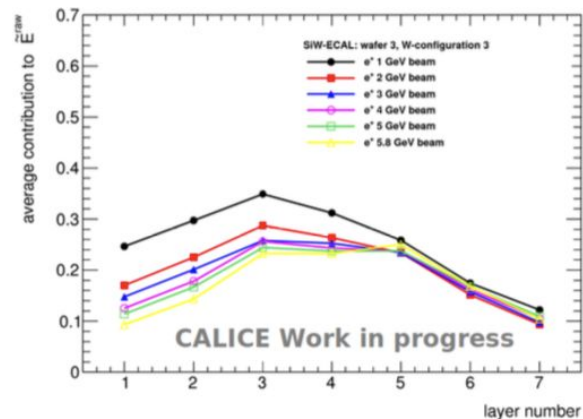
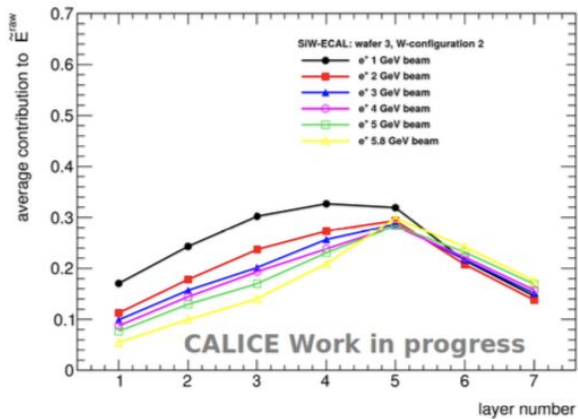
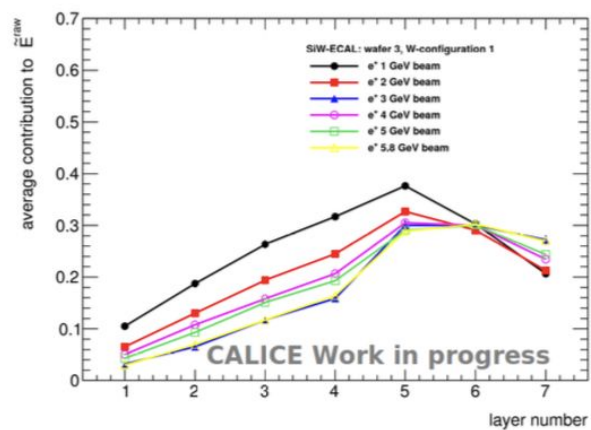


Fit results conf3 - 1, 2, 3 // 4, 5, 5.8 GeV

(E0 normalization to be fixed)

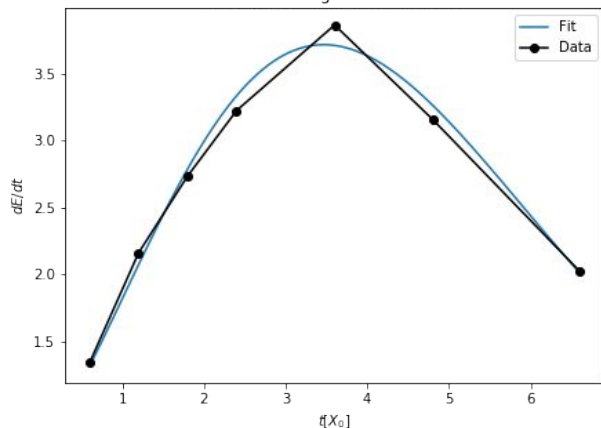


Backup

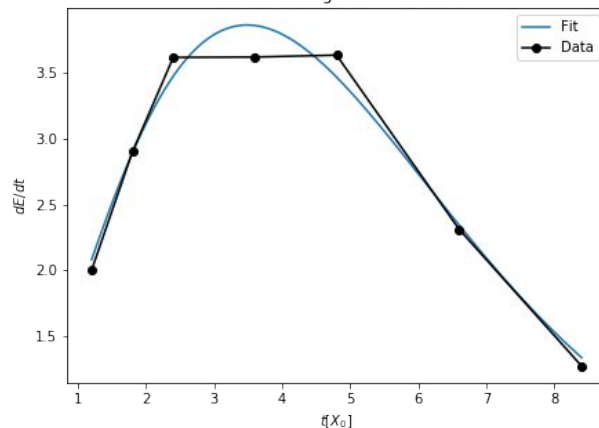


Fitting the sum of energy deposition (1 GeV)

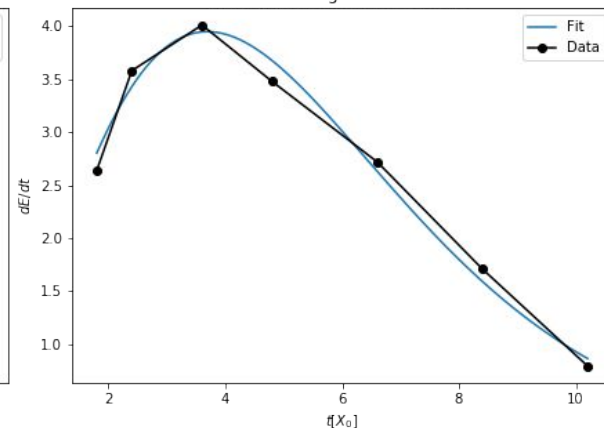
Shower average fit conf1 1GeV



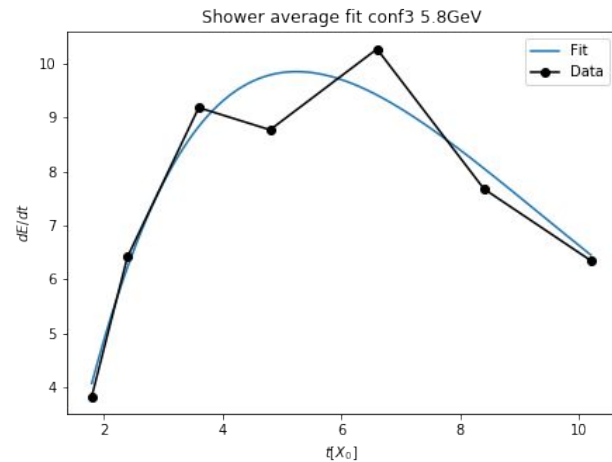
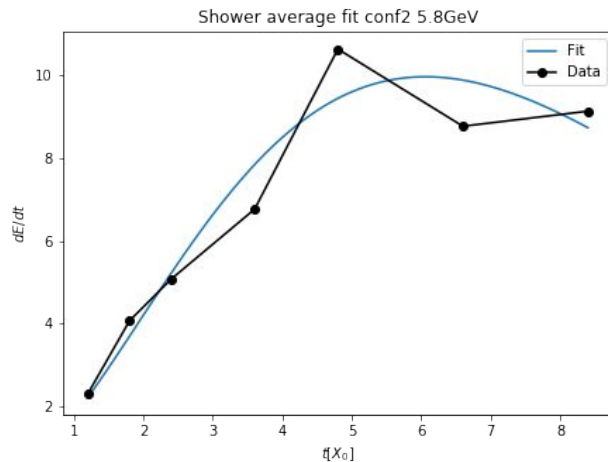
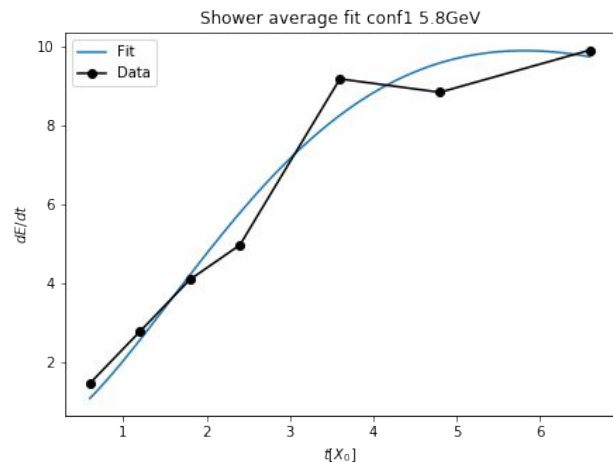
Shower average fit conf2 1GeV



Shower average fit conf3 1GeV

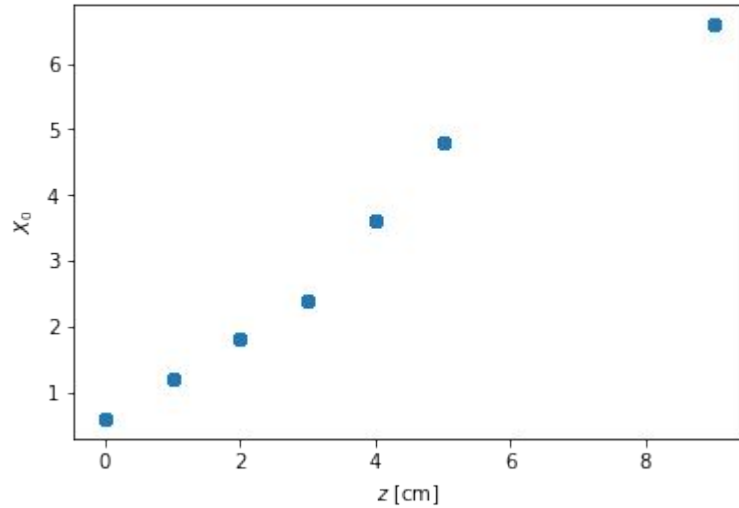


Fitting the sum of energy deposition (5.8 GeV)

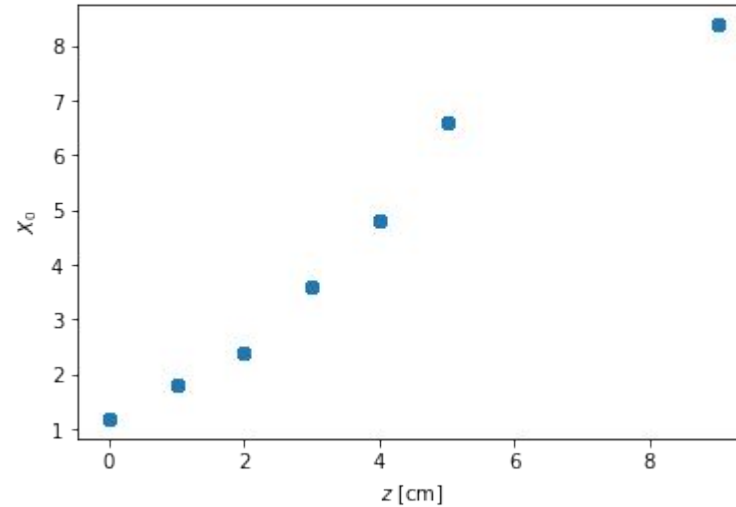


Z and X0 for configurations

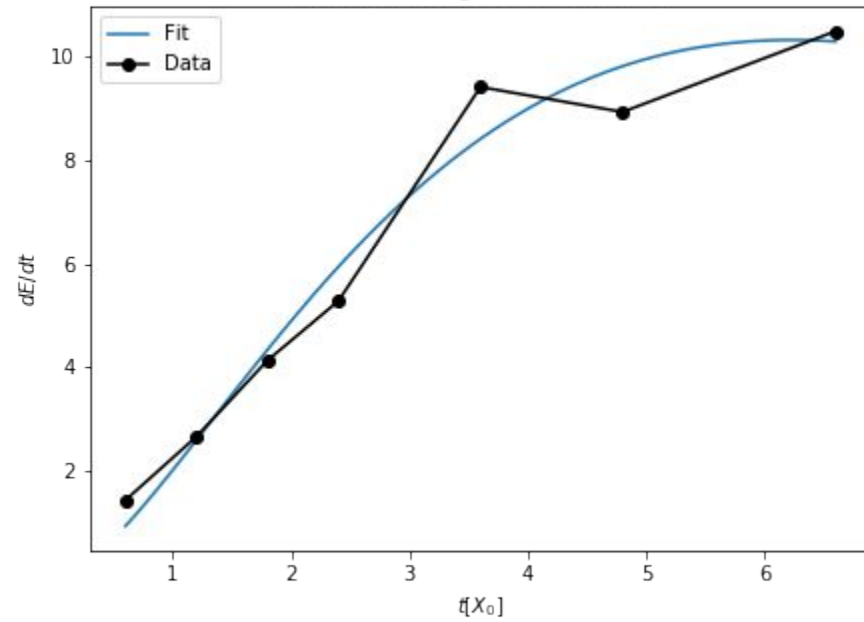
Relation between z and x0 for conf1



Relation between z and x0 for conf2



Shower average fit conf1 3GeV



Shower average fit conf1 5.8GeV

