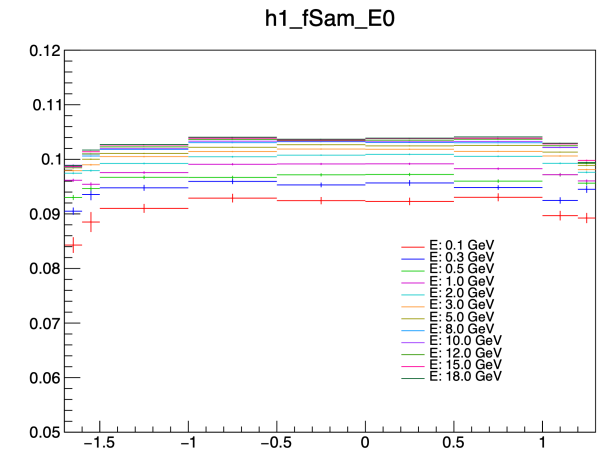
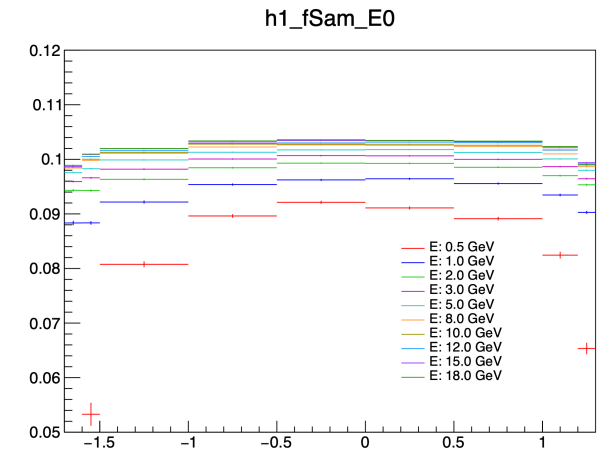
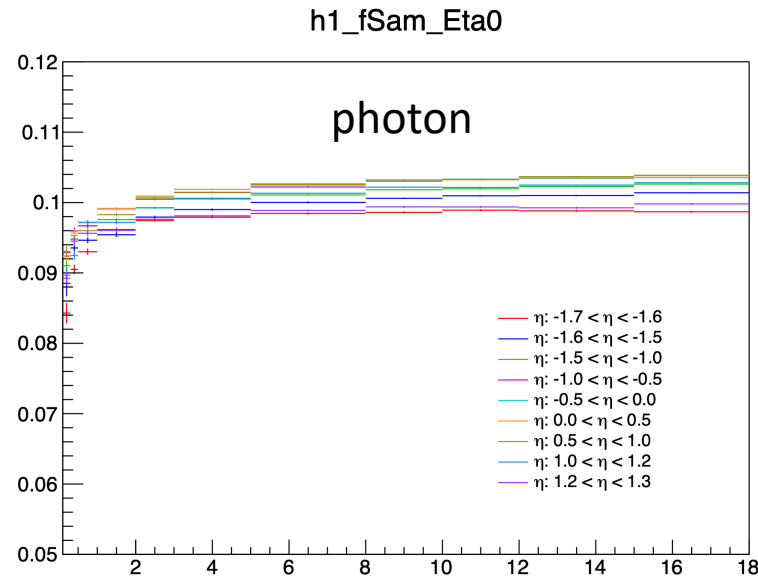
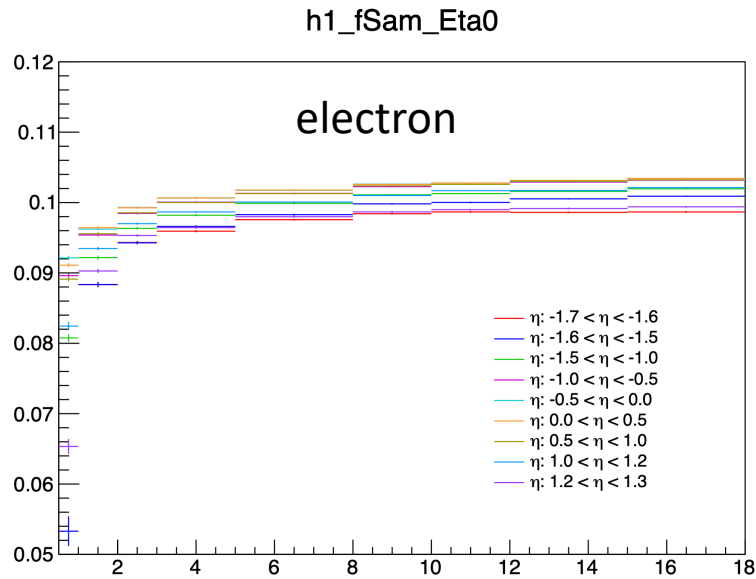


BIC simulation report (Korea)

24/6/11

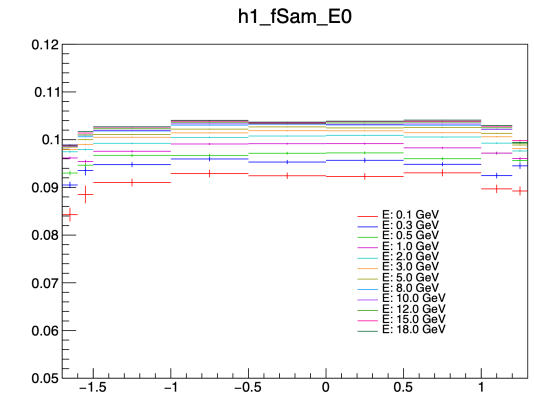
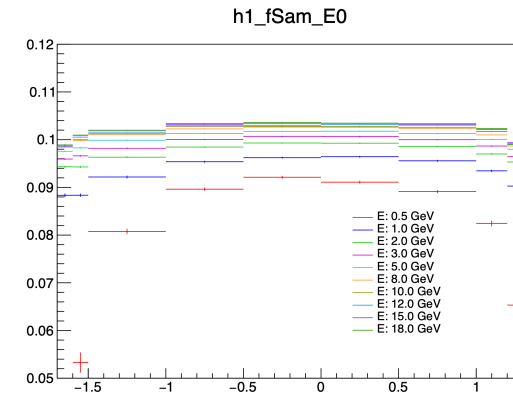
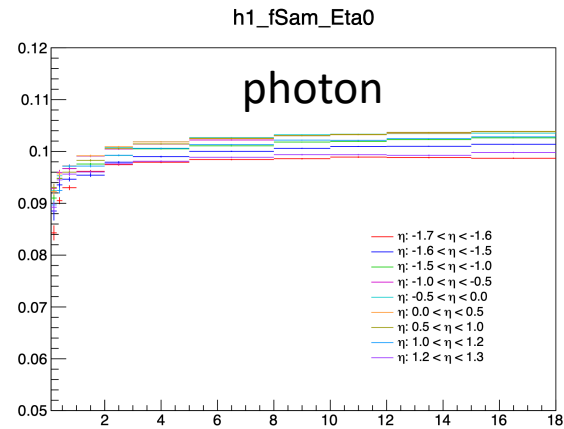
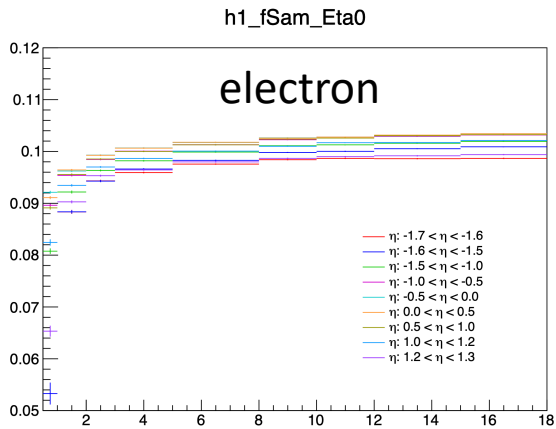
Jeongsu Bok (PNU), Jaehyeok Ryu(PNU),
Joonsuk Bae(SKKU), Harim Seong(SKKU),
Changhui Lee (KNU)

Sampling Fraction



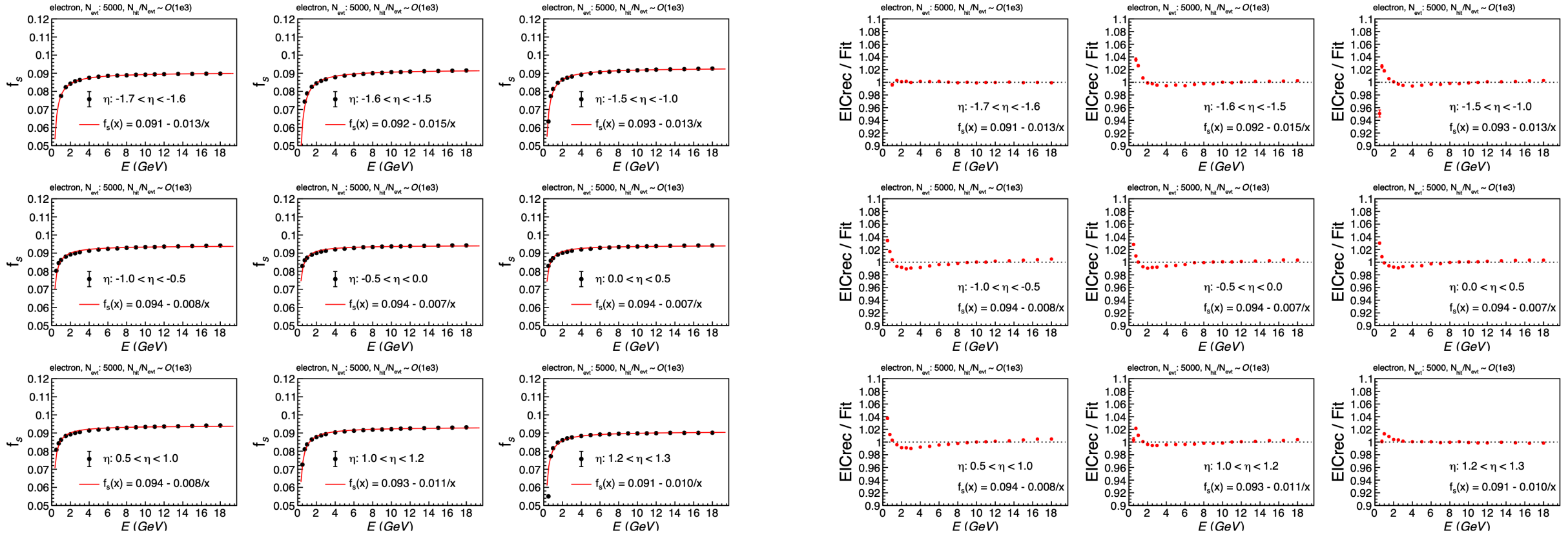
- (exact) E (histogram shifted to left)
 - e[9]: 1, 2, 3, 5, 8, 10, 12, 15, 18 // 0.3,0.5 for photons[11]
 - Now
 - Photon[22+6] 0.1, (0.15, 0.2, 0.25), 0.3, (0.35, 0.4, 0.45), 0.5, 0.75, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.5, 15, 16.5, 18
 - Elec[19]: 0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.5, 15, 16.5, 18
- (range) η bin: -1.7, -1.6, -1.5, -1, -.5, 0, .5, 1, 1.2, 1.3, 1.4

Sampling Fraction 1D fit



- Tried to fit $f_s(E)$ because it looked possible.
- Sigmoid function $[0]/([1] + \text{TMath}::\text{Exp}([2]*x-[3]))$ did not provide best fit although we tried to set the parameters
 - $[0]/([1]/x)$ for electrons
 - $[0]/([1]/x^{[2]})$ for photons
- Considering 2D

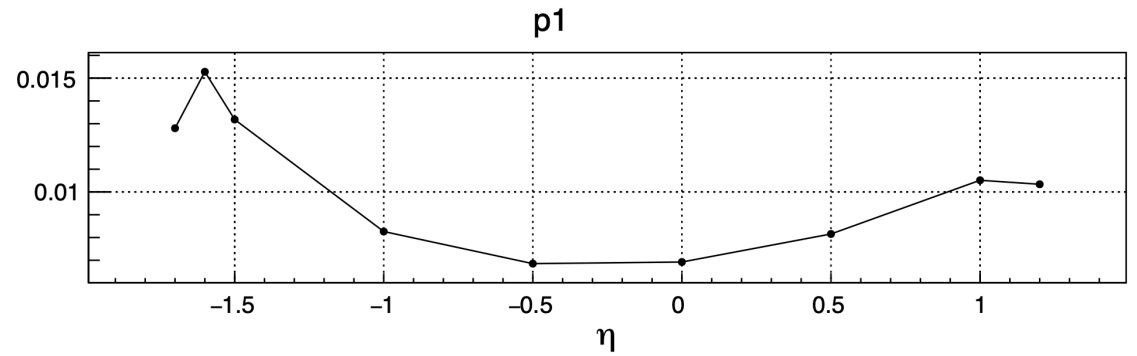
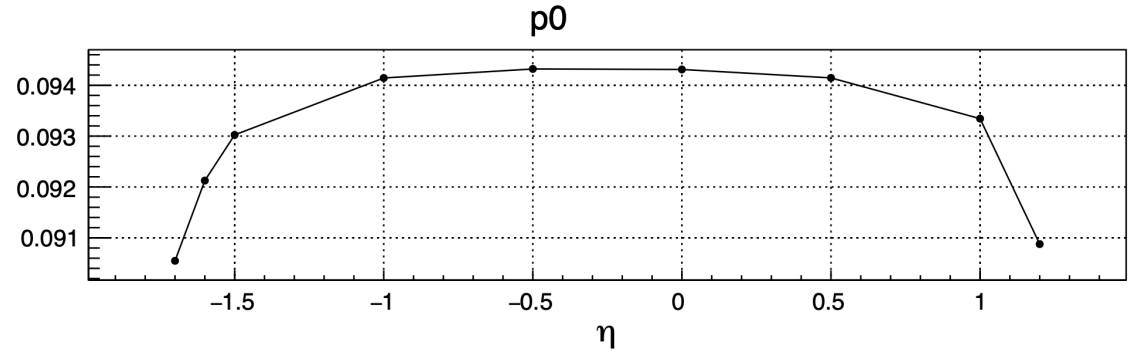
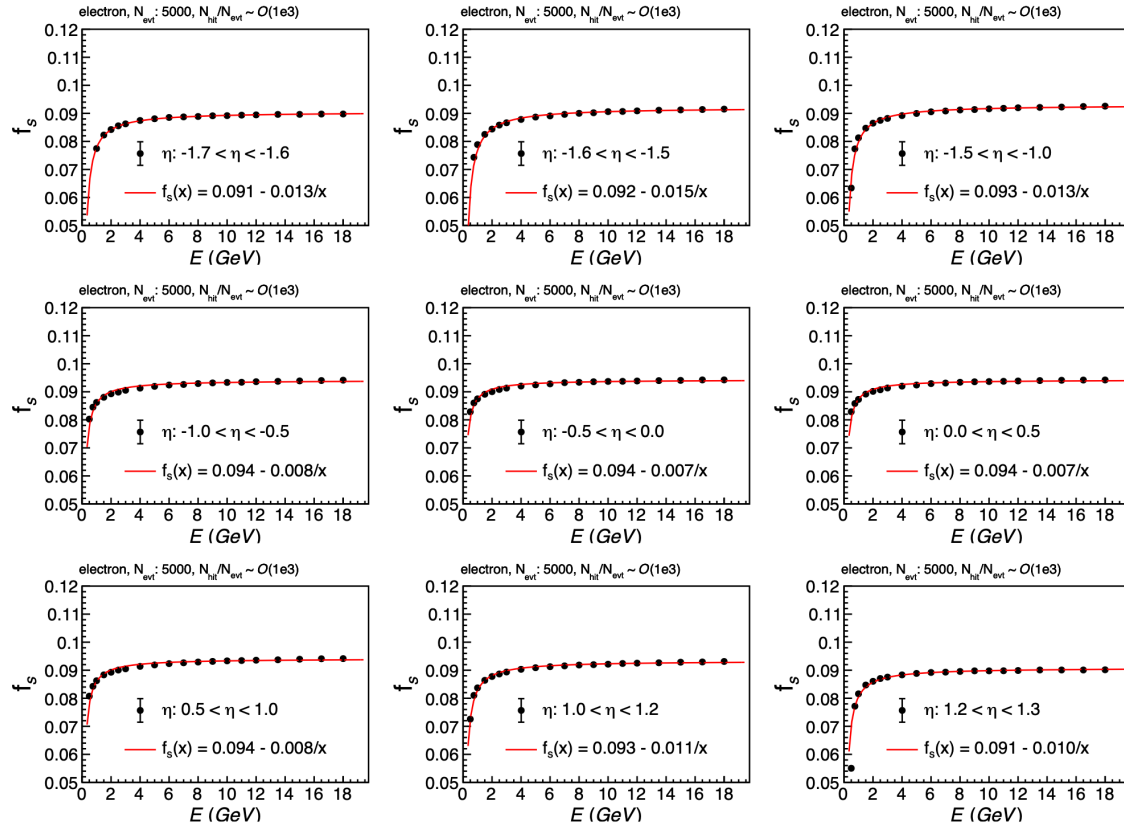
Sampling Fraction 1D fit (electron, [0]+[1]/E)



- [0]+[1]/E
 - 3~4% deviation at 0.1 GeV, 2% at 0.3 GeV
 - Sigmoid function $[0]/([1] + TMath::Exp([2]*x-[3]))$ did not work

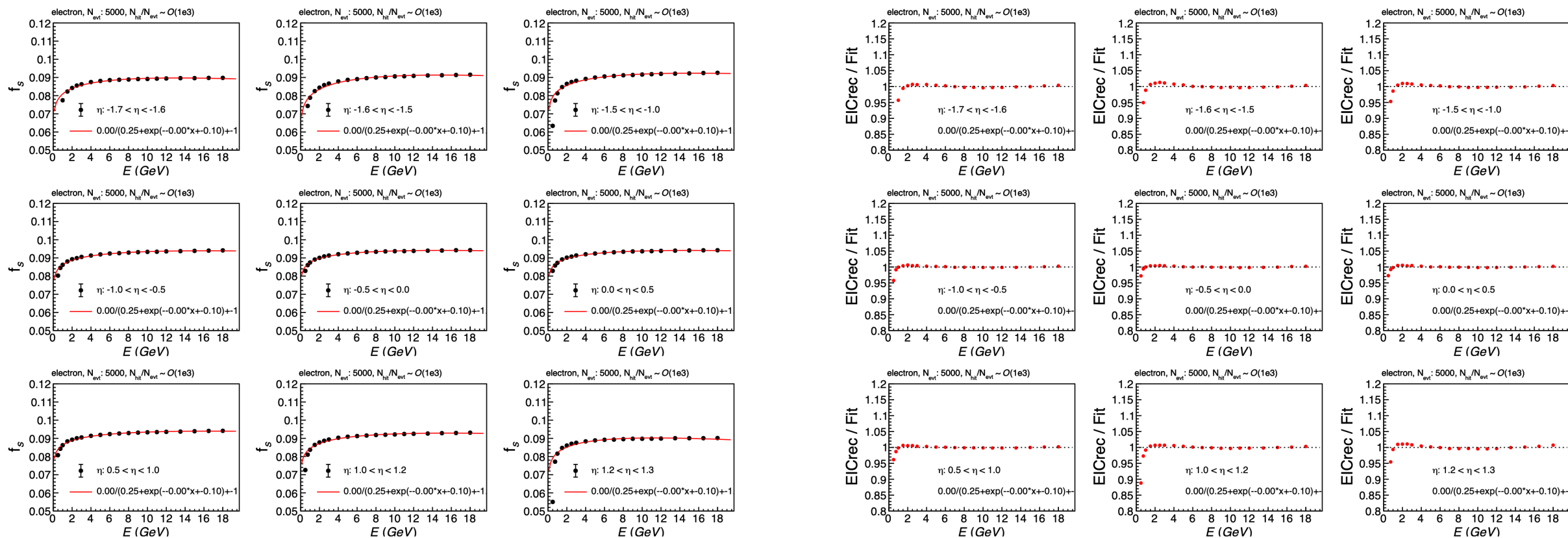
Points/ function

Sampling Fraction 1D fit (electron, [0]+[1]/E) Parameters



(eta bins are shifted to left)

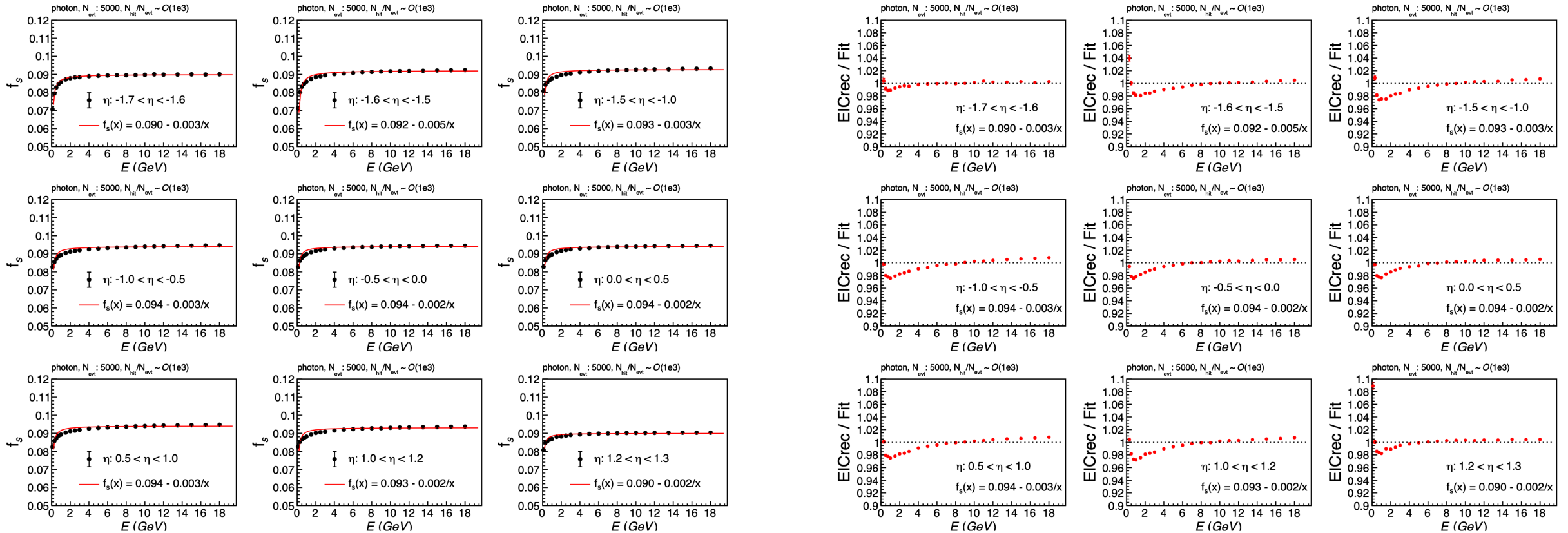
Sampling Fraction 1D fit (electron, 5 parameters)



Points/ function

- $[0] / ([1] + \exp(- [2]*x + [3]) + [4]*x^{[5]})$
- deviation at 0.5 GeV, others within 1%

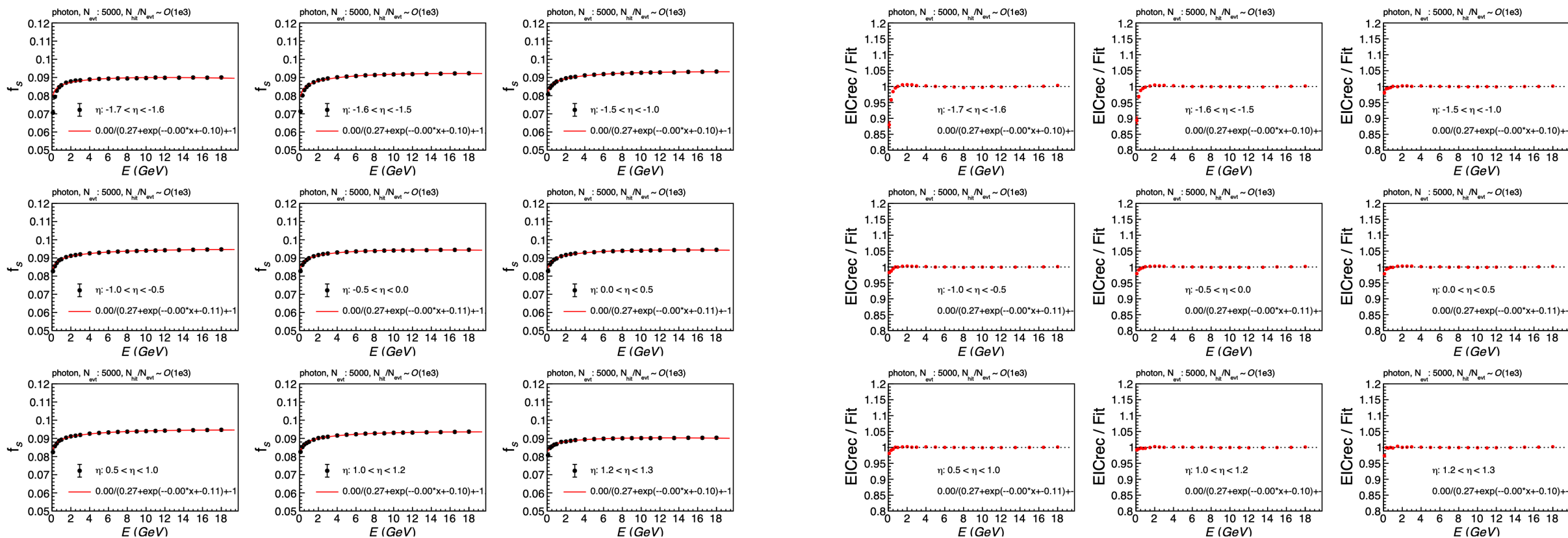
Sampling Fraction 1D fit (photon , [0]+[1]/E)



- [0]+[1]/E
 - ~3% deviation ~1GeV
 - Sigmoid function $[0]/([1] + TMath::Exp([2]*x-[3]))$ did not work

Points/function

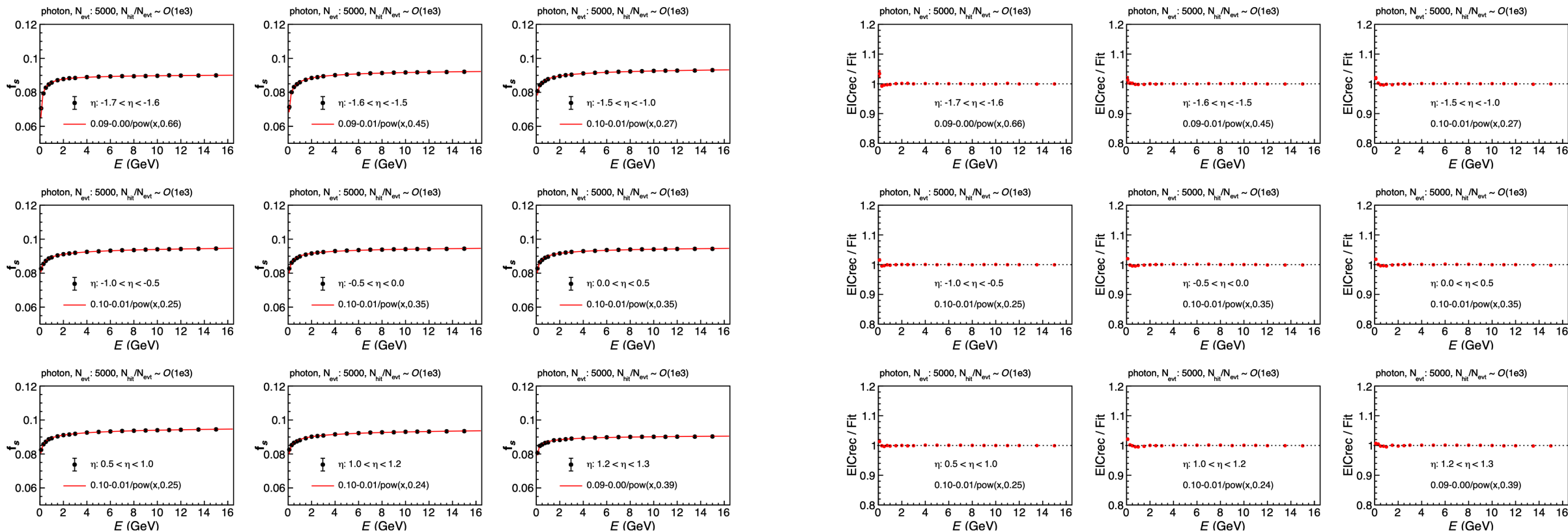
Sampling Fraction 1D fit (photon, 5 parameters)



Points/ function

- $[0] / ([1] + \exp(- [2] \cdot x + [3])) + [4] \cdot x^{[5]}$
- good except for 0.1, 0.3 GeV

Sampling Fraction 1D fit (photon, [0]+[1]/E^[2])

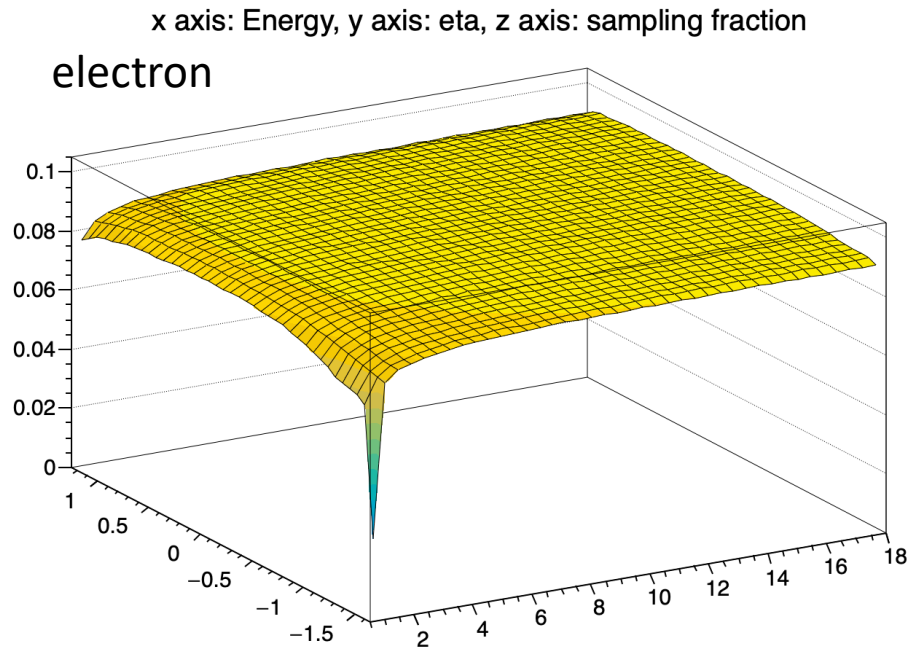


Points/ function

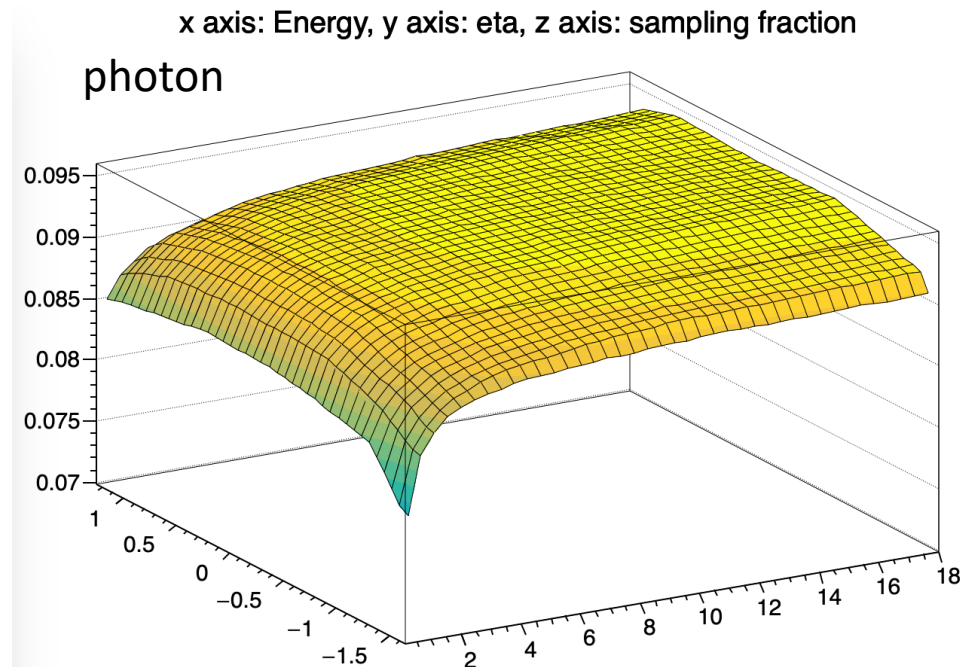
- [0] / ([1]/x^[2])
 - Better than other function, but still 3 parameters

What we are looking at: Interpolation with 2D

- TGraph2D: Interpolation(x,y) , TH2: Interpolate(x,y)
 - They may require all points are filled (-1.7<eta<-1.6 for 0.5GeV electron?)
- range(mean) or exact eta?



Fit failure for Electron 0.5 GeV at $-1.7 < \eta < -1.6$



To do next

- To do next
 - Sampling fraction
 - Check low energy
 - move to deposited energy (make things sensitive)
 - Geometry
 - Make a module with 9 astropix chips and other materials
 - Overlap region between barrel and endcap
 - plot the sum of SciFi Reco Hit energy from Barrel and Endcap as a function of rapidity
 - plot the sum of SciFi Reco Hit energy from Barrel only as a function of rapidity

backup

News from Korea

- New member: Changhui Lee (KNU) Ph. D student
 - Geant4 experience in DRC. I asked him to start with a prototype simulation
 - Considering more member from Yonsei
 - (plenty of experience with Dual Readout Calorimeter)
- Simulation
 - Sampling fraction ongoing, result will be shown
 - Boundary region will be studied
 - Geometry is also ongoing (Jaehyeok Ryu)
 - Looking for more topics for TDR and further study.