

Weekly Updates On nu e Meeting

Chi_Squared check & Flux High Energy Tail Fitting

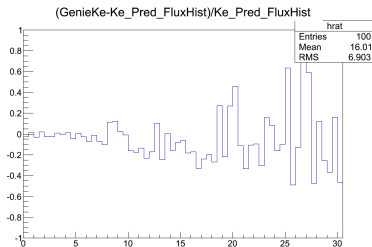
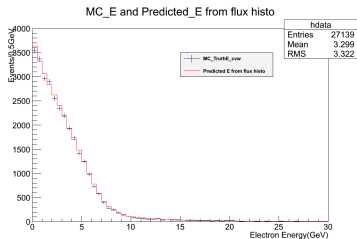
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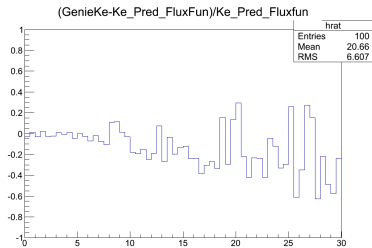
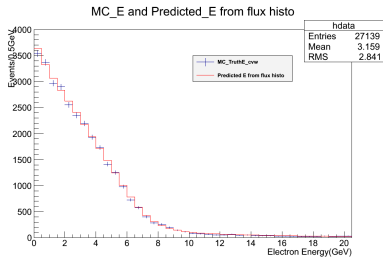
Genie Data and Ke Prediction from Original Flux Histogram



Genie Data and Ke Prediction from Original Flux Histogram
Bin-size: 0.5 GeV

Range(GeV)	0-5	5-10	10-15	15-20	20-25	25-30	0-30
χ^2	1.474	1.614	2.202	1.919	0.947	1.713	1.645

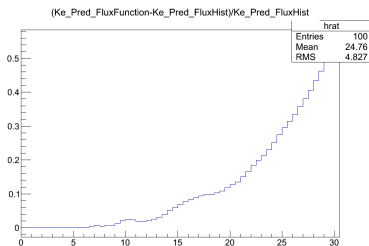
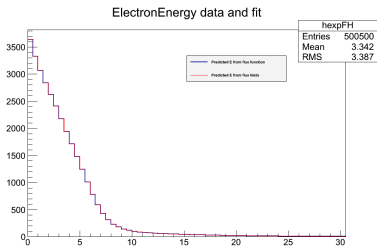
Genie Data and Ke Prediction from Flux Function



Genie Data and Ke Prediction from Flux Function Histogram
Bin-size: 0.5 GeV

Range(GeV)	0-5	5-10	10-15	15-20	20-25	25-30	0-30
chi ²	1.483	1.665	2.856	3.255	2.178	4.076	2.586

Ke_FluxFun vs Ke_FluxHist



right:

$(Ke_Prid_FluxFunction - Ke_Prid_FluxHist) / Ke_Prid_FluxHist$

Range(GeV)	0-5	5-10	10-15	15-20	20-25	25-30	0-30
chi ²	0.00034	0.01264	0.06130	0.23824	0.45991	0.87592	0.275

High Energy Tail Normalization

Use the tail(20-50 GeV) of the electron energy data to constrain the flux high energy tail(20-50 GeV).

In the prediction(flux histogram):

take the ratio flux->Integral(20,50)/Ke data -> Integral(20,50)

$$R_1 = \frac{\text{FluxHistoIntegral}(20 - 50 \text{ GeV})}{\text{KePredictionIntegral}(20 - 50 \text{ GeV})} = \frac{8.0147e - 6}{344}$$

In the ke fitting code, 20-50 tail integral of the ke data should be equal to the fitted ke:

$$R_2 = \frac{\text{FittedFluxFunctionIntegral}(20 - 50 \text{ GeV})}{\text{KeDataIntegral}(20 - 50 \text{ GeV})} = \frac{\text{FittedFluxFunctionIntegral}(20 - 50 \text{ GeV})}{343}$$

the two ratio R_1 and R_2 should be equal, $R_1 = R_2$, then we get:

$$\text{FittedFluxFunctionIntegral}(20 - 50 \text{ GeV}) = 7.9914e - 6$$

and because

$$\text{InitialFluxFunctionIntegral}(20 - 50 \text{ GeV}) = 8.0091e - 6$$

ratio of the scaling parameter is

$$\frac{\text{FittedPar}}{\text{InitialPar}} = \frac{7.9914e-6}{8.0091e-6} = 0.99779$$

so, the Fitted Parameter is:

$$\text{FittedPar} = 0.99779 \times \text{InitialPar} = 0.99779 \times 1.20056e - 05 = 1.198e - 05$$

Error is :

$$\text{Err} = \sqrt{8.0147e - 6} \times \frac{\sqrt{343}}{\sqrt{344}} \times \frac{1}{\sqrt{8.0147e-6}} \times 1.20056e - 05$$

Fitting the Scaling Par of the tail

Fitted numbers are from last week, not the truth.

p6 is the parameter got fitted.

Par	p0(a1)	p1(m1)	p2(s1)	p3(a2)
True	1.70e-04	5.49215	1.58290	5.83993e-5
Fitted	1.718e-4	5.418	1.573	4.040e-5
Error	0.046e-4	0.148	0.046	0.921e-5
Par	p4(m2)	p5(s2)	p6(a3)	p7(m3)
True	3.07003e+00	7.28800e-1	1.20056e-05	8.21823e+00
Fitted	fixed	9.913e-1	1.198e-05	fixed
Error	–	3.486e-1	?	–
Par	p8(s3)	p9(L1)	p10(L2)	p11(L3)
True	2.47368e+00	$\frac{9.70000e-06}{p6} \times p6$	1.60000e+01	2.20160e+00
Fitted	fixed	combined with p6	fixed	fixed
Error	–	–	–	–
Par	a0	m0	s0	
Value	1.01614e-5	6.46886e-1	2.65780e-1	