

## **GENIE Comparison**

### **Datasets:**

**miniboone\_nuccqe\_2010  
miniboone\_nucc1pi0\_2010  
miniboone\_nucc1pip\_2011  
miniboone\_nubarccqe\_2013  
t2k\_nd280\_numucc0pi\_2015\_rps  
t2k\_nd280\_numucc0pi\_2015  
t2k\_nd280\_numucc\_2013**

### **Model:**

**master/G18\_02a\_00\_000**

**2018/10/15 09:39:59**



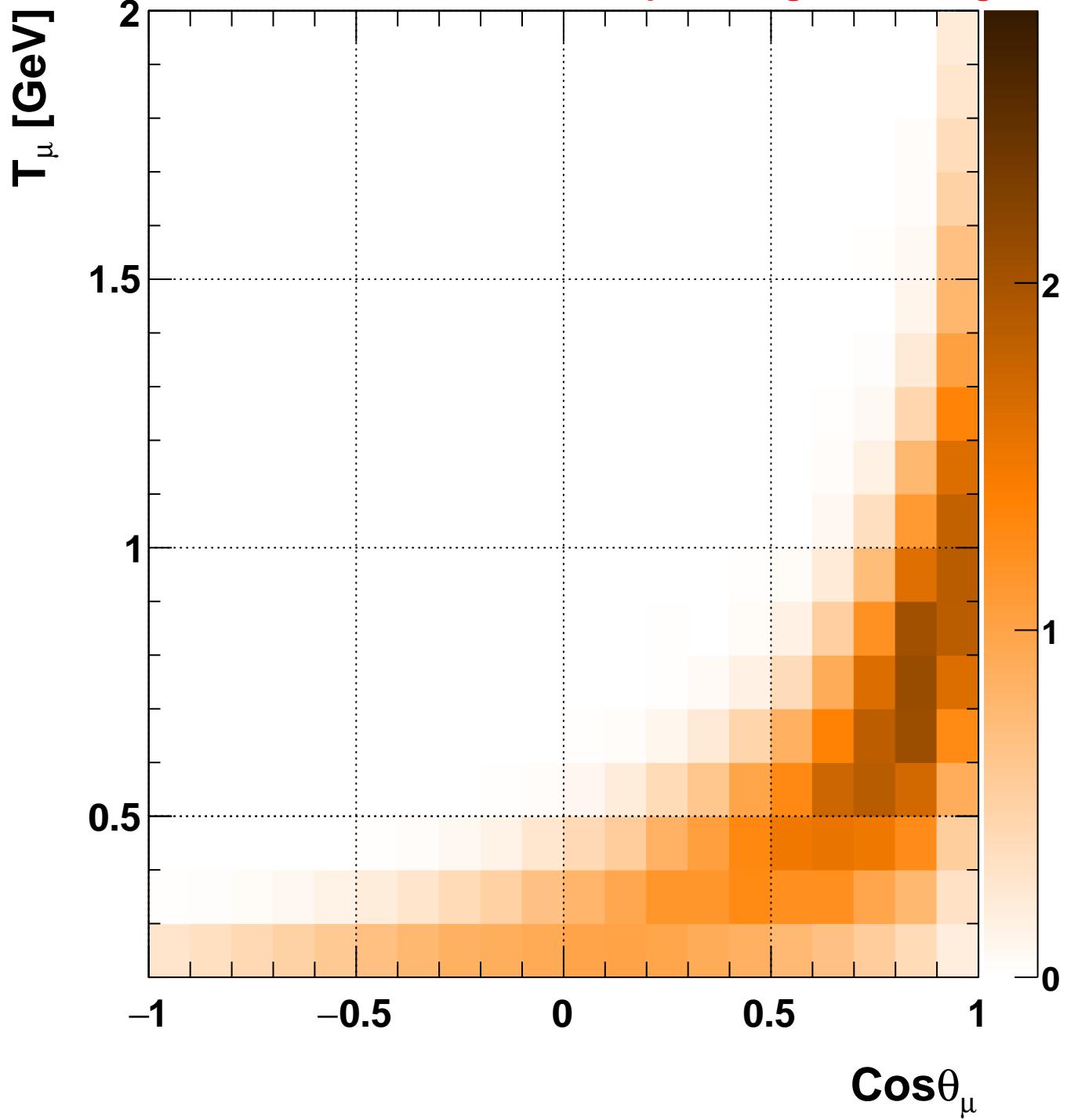
**Dataset:**  
**miniboone\_nuccqe\_2010**

**Model:**  
**master/G18\_02a\_00\_000  $\chi^2 = 338 / 137$  DoF**

**Plot:**  
 $\partial^2 \sigma(\nu_\mu \text{ CC } 0\pi) / \partial \text{Cos}\theta_\mu / \partial T_\mu$   
**137 DoF,  $\chi^2 = 338$**

**2018/10/15 09:39:59**

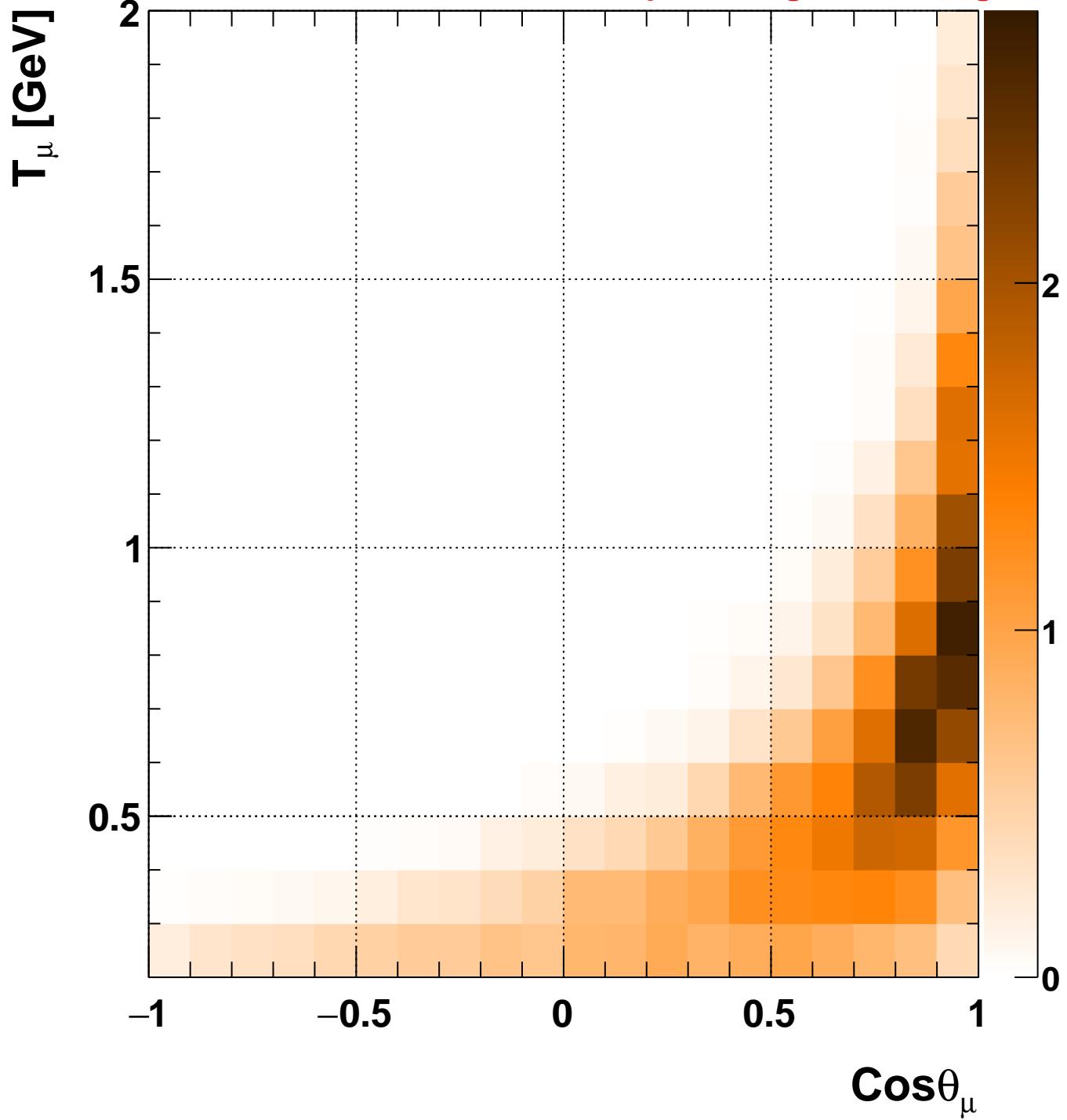
© 2003-2018, GENIE - <http://www.genie-mc.org>



$\partial^2\sigma(\nu_\mu \text{ CC } 0\pi)/\partial \text{Cos}\theta_\mu/\partial T_\mu$  [ $10^{-38} \text{ cm}^2/\text{GeV/n}$ ]

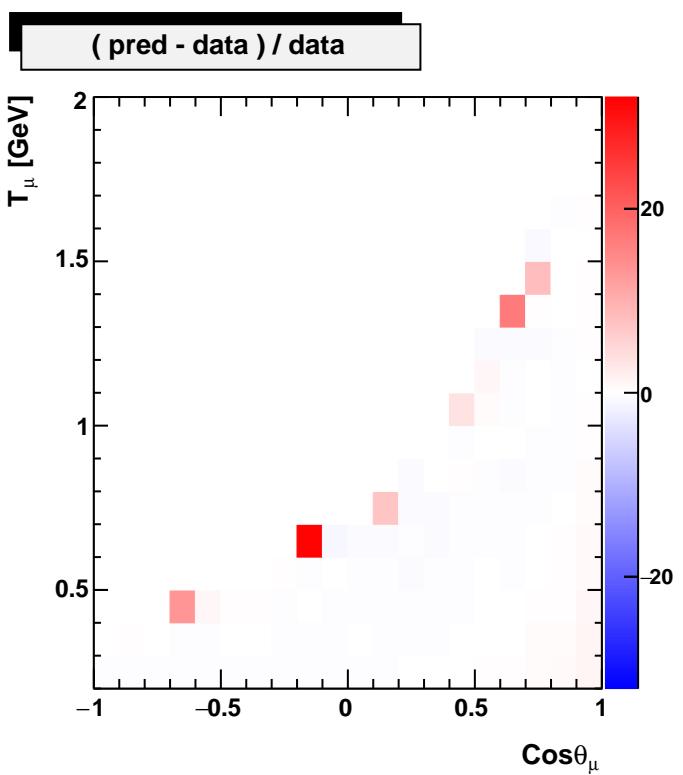
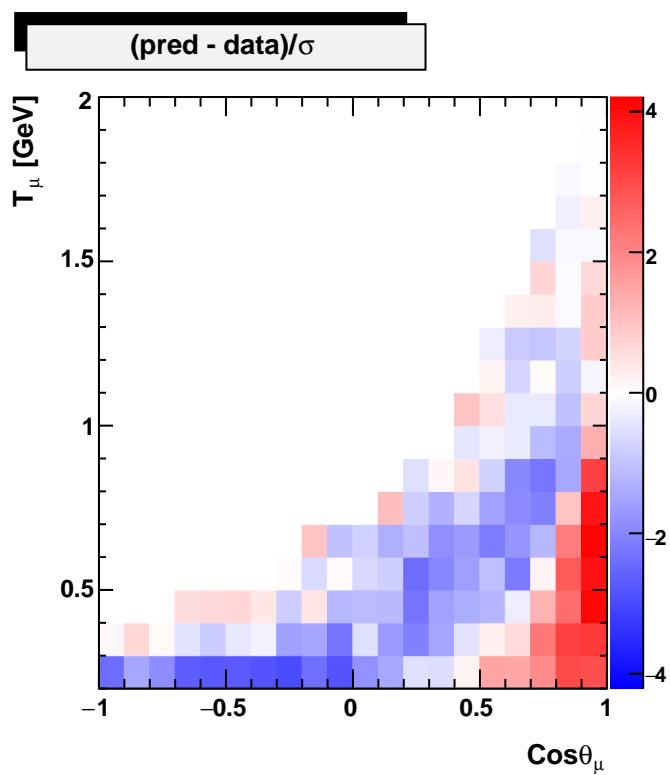
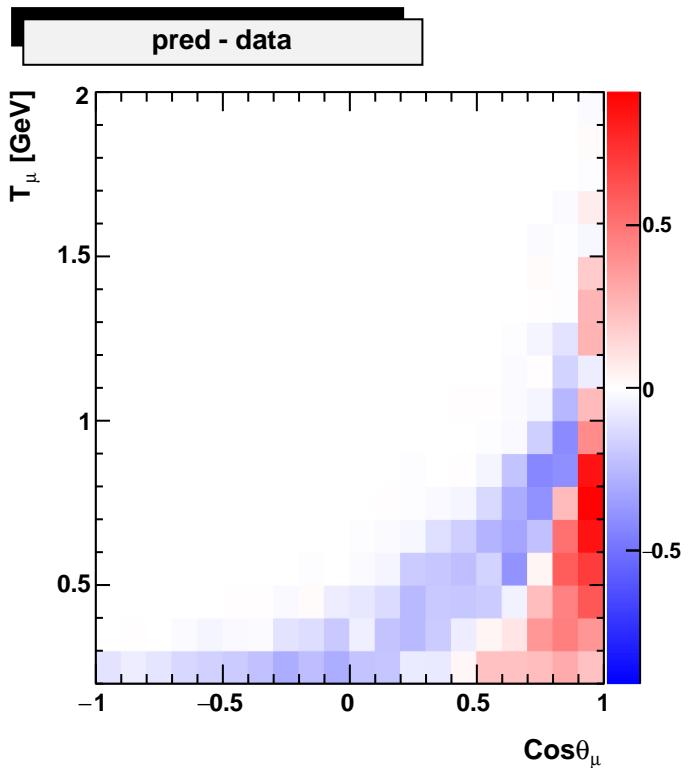
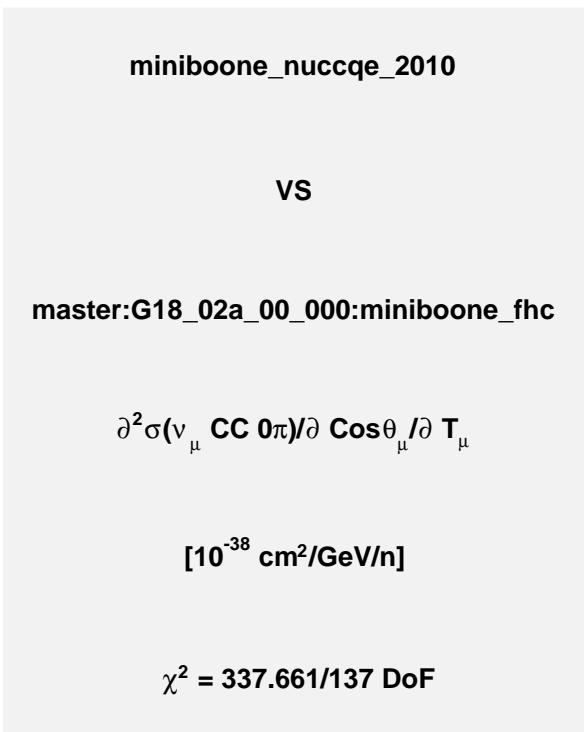
Data: miniboone\_nuccqe\_2010

© 2003-2018, GENIE - <http://www.genie-mc.org>

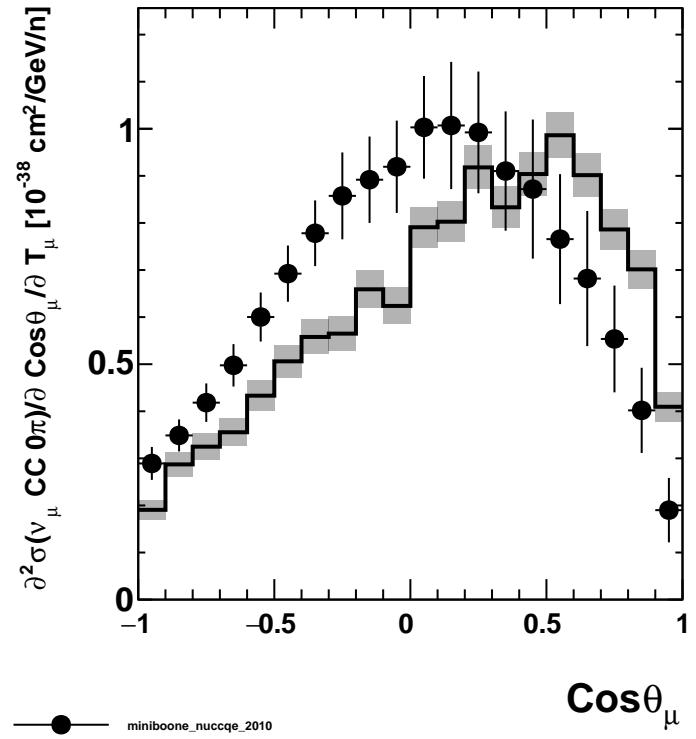


$$\partial^2 \sigma(v_\mu \text{ CC } 0\pi) / \partial \text{Cos}\theta_\mu / \partial T_\mu [10^{-38} \text{ cm}^2/\text{GeV}/n]$$

Pred: master:G18\_02a\_00\_000:miniboone\_fhc



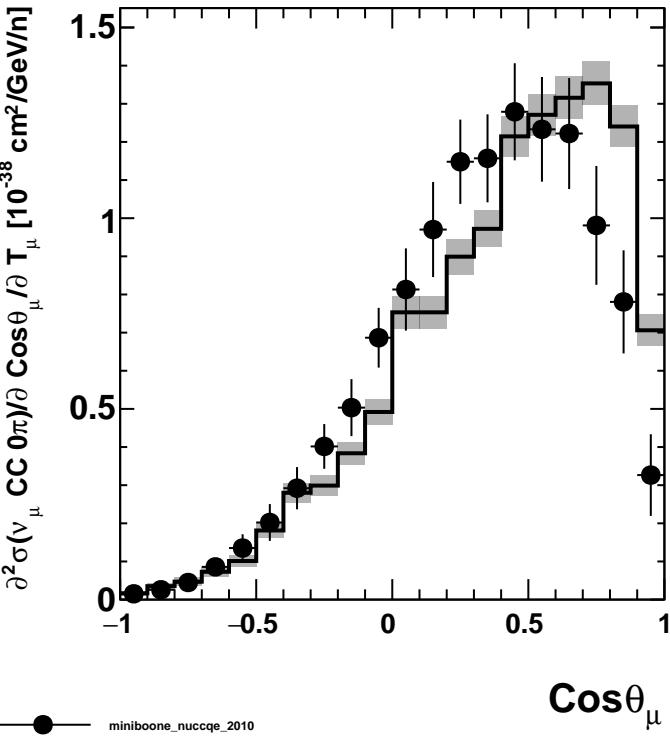


$T_\mu \in [0.2; 0.3] \text{ GeV}$  $T_\mu \in [0.3; 0.4] \text{ GeV}$ 

miniboone\_nuccqe\_2010

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 94.9/20 \text{ DoF}$

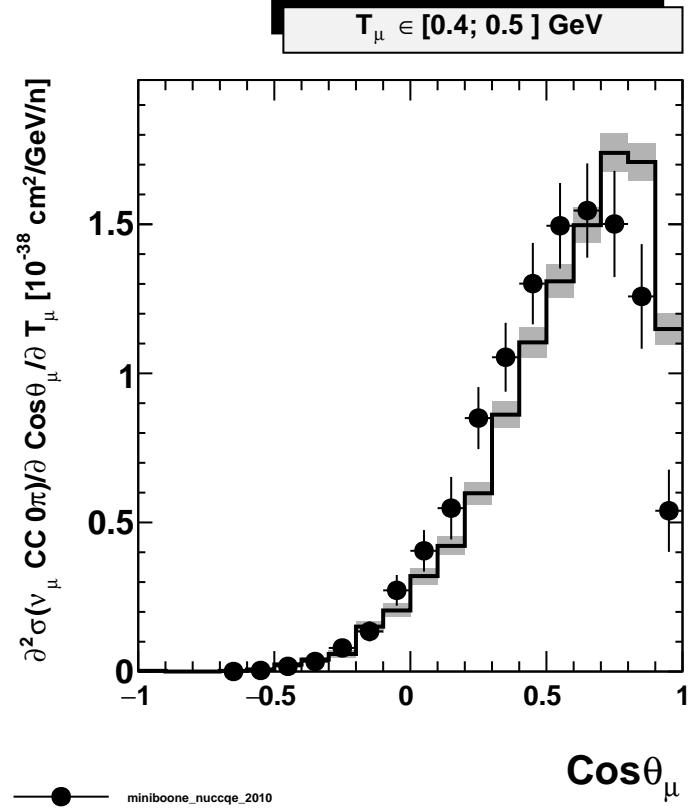
$\cos\theta_\mu$



miniboone\_nuccqe\_2010

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 47.8/20 \text{ DoF}$

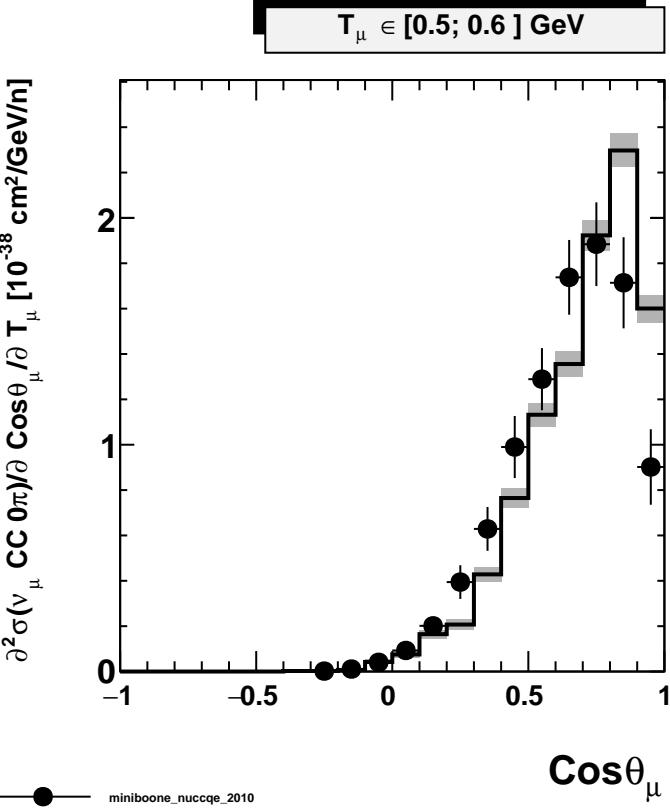
$\cos\theta_\mu$



miniboone\_nuccqe\_2010

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 41.8/17 \text{ DoF}$

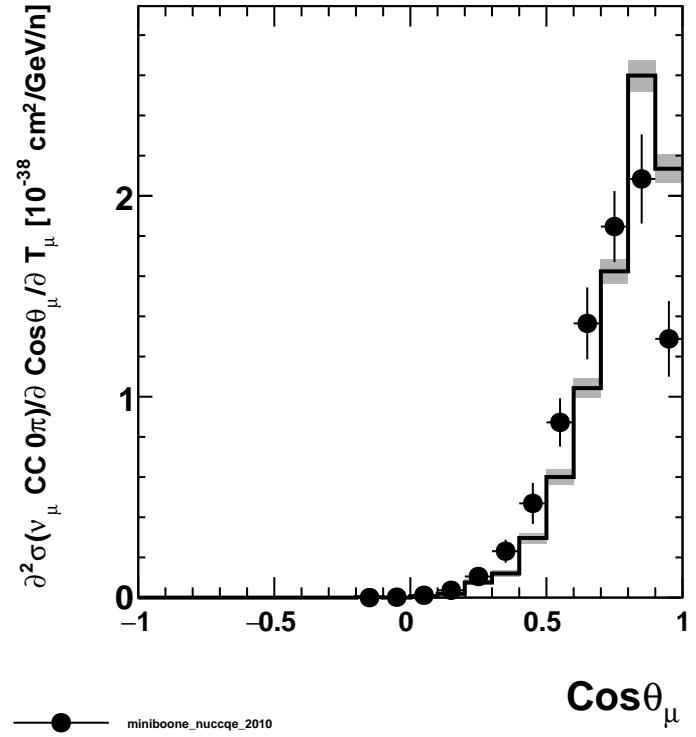
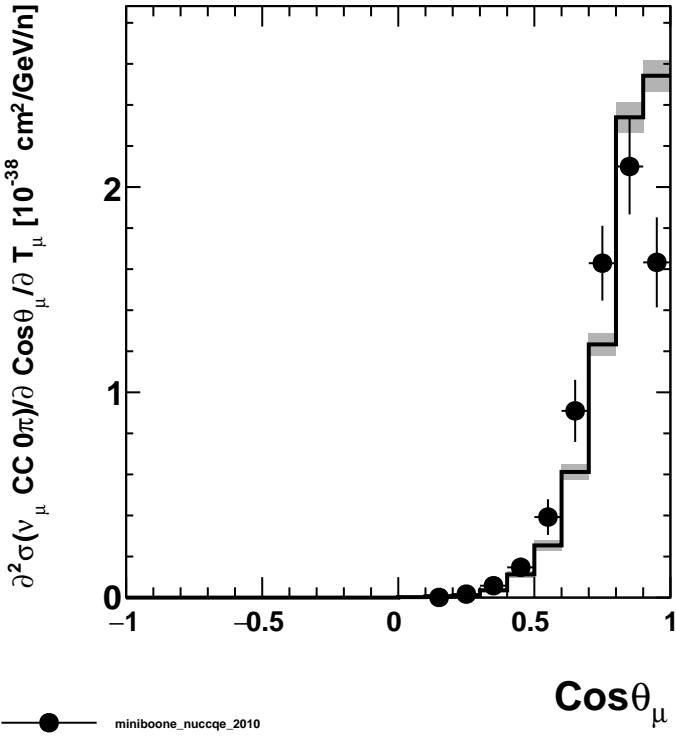
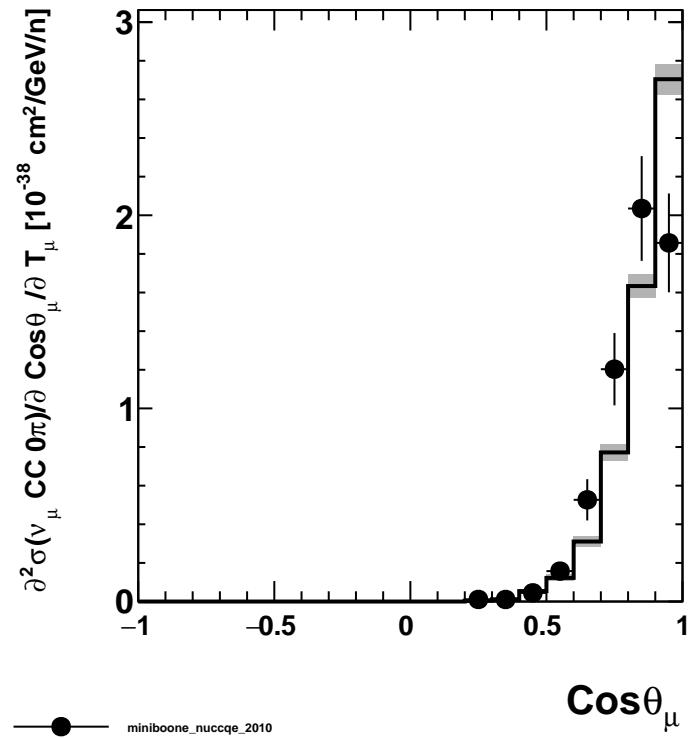
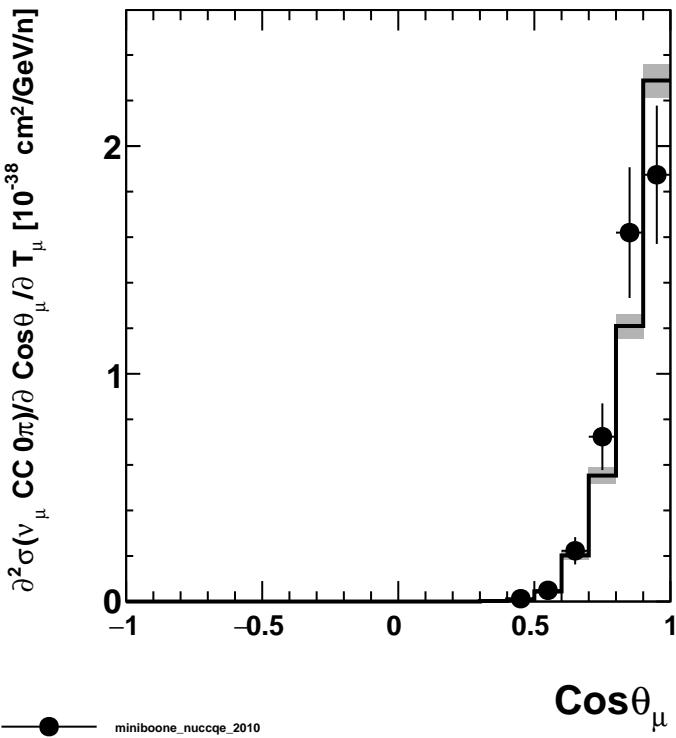
$\cos\theta_\mu$

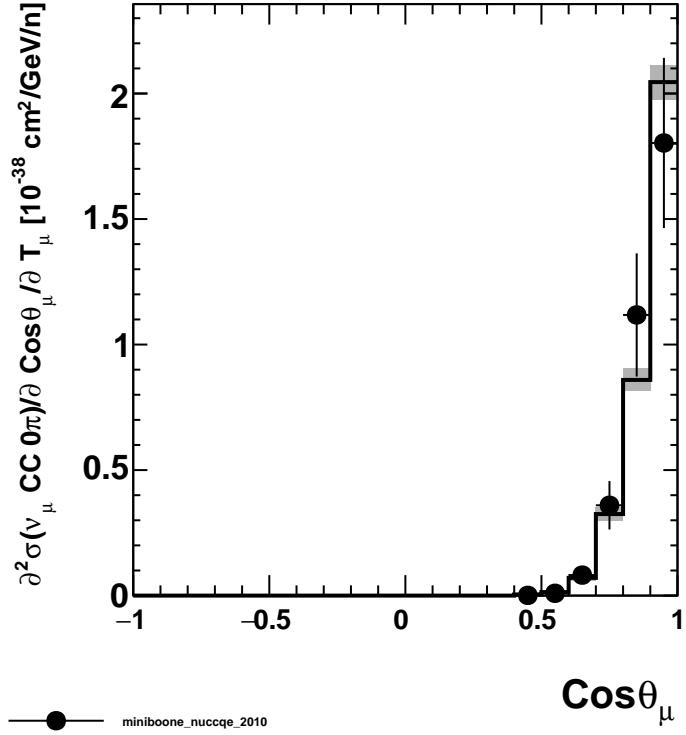
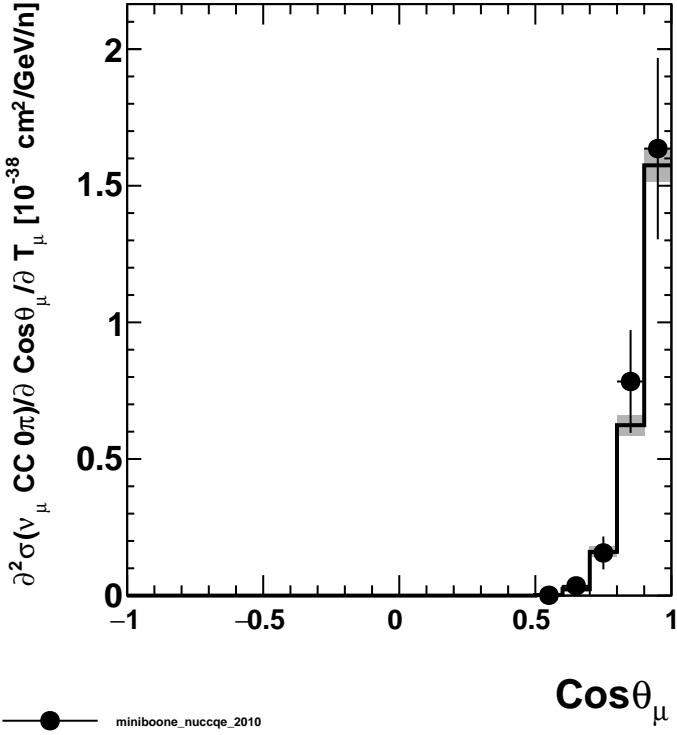
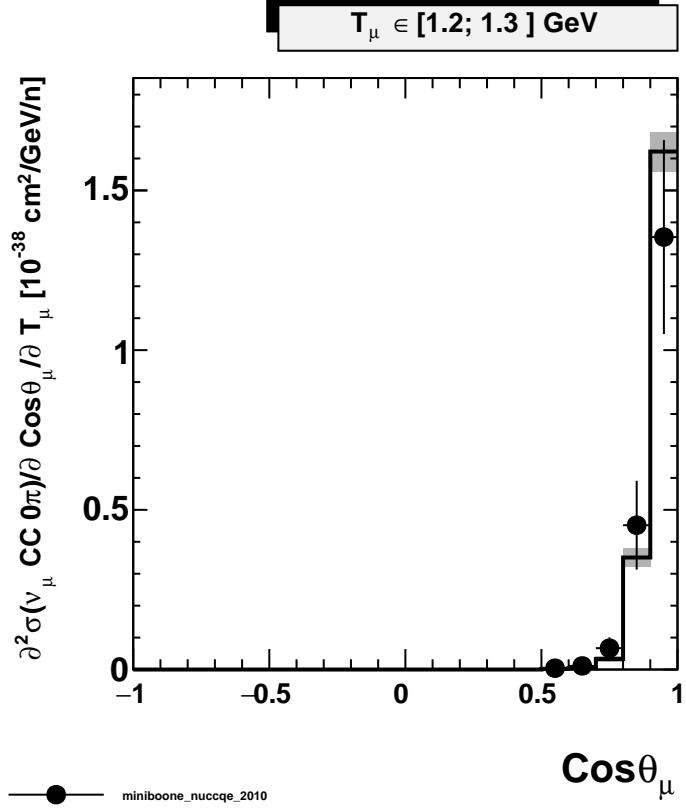
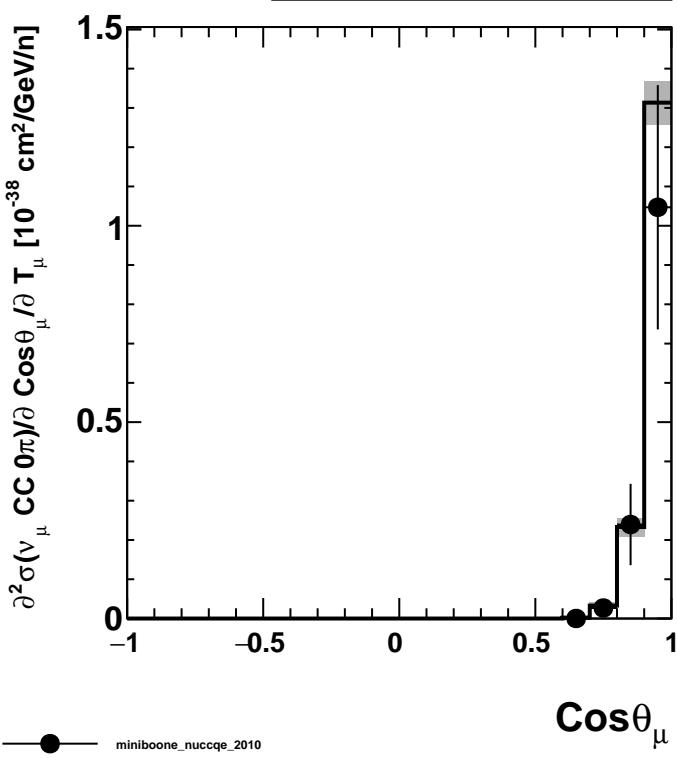


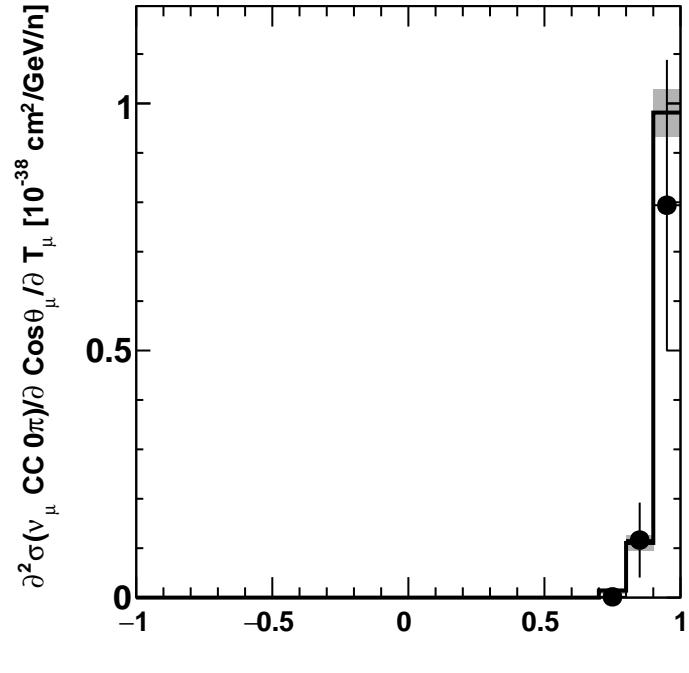
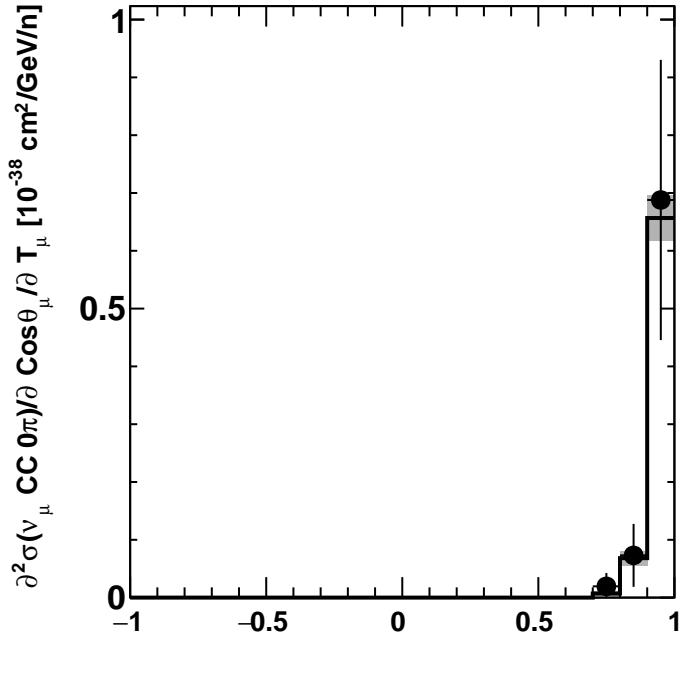
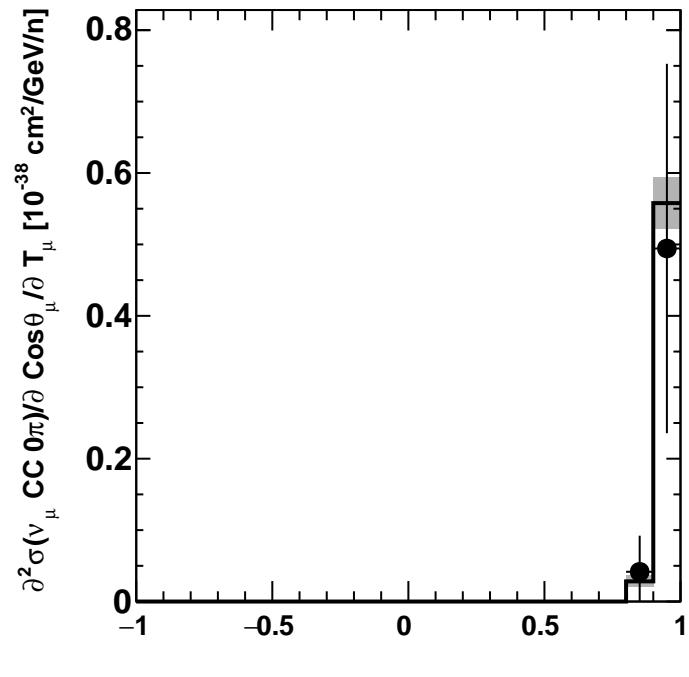
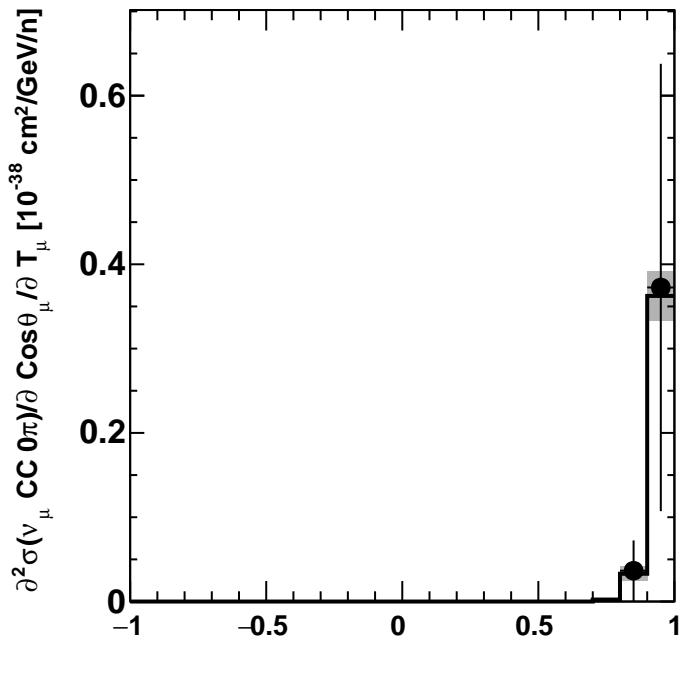
miniboone\_nuccqe\_2010

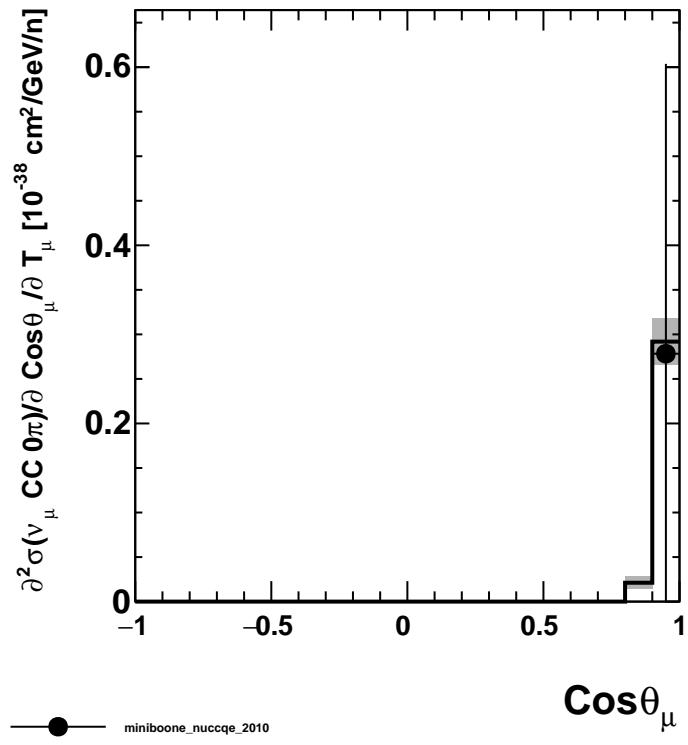
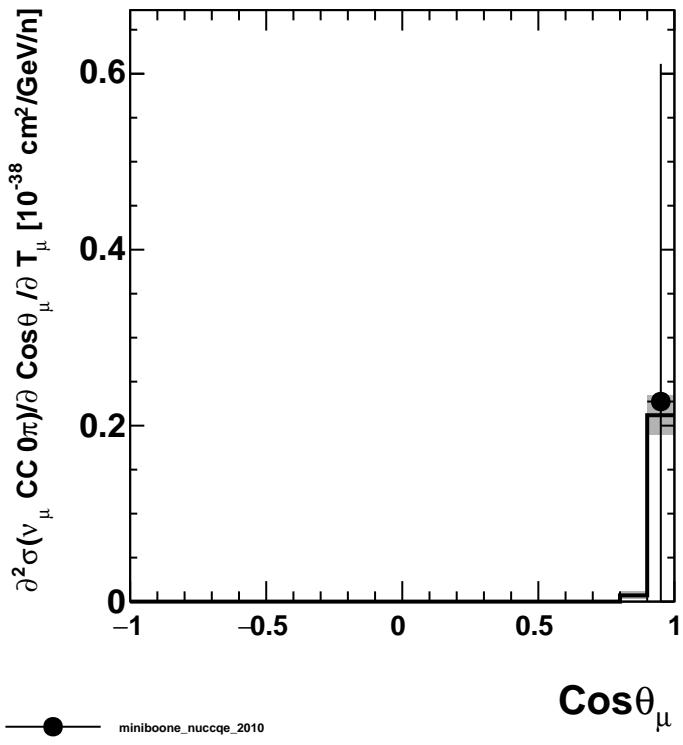
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 42.6/13 \text{ DoF}$

$\cos\theta_\mu$

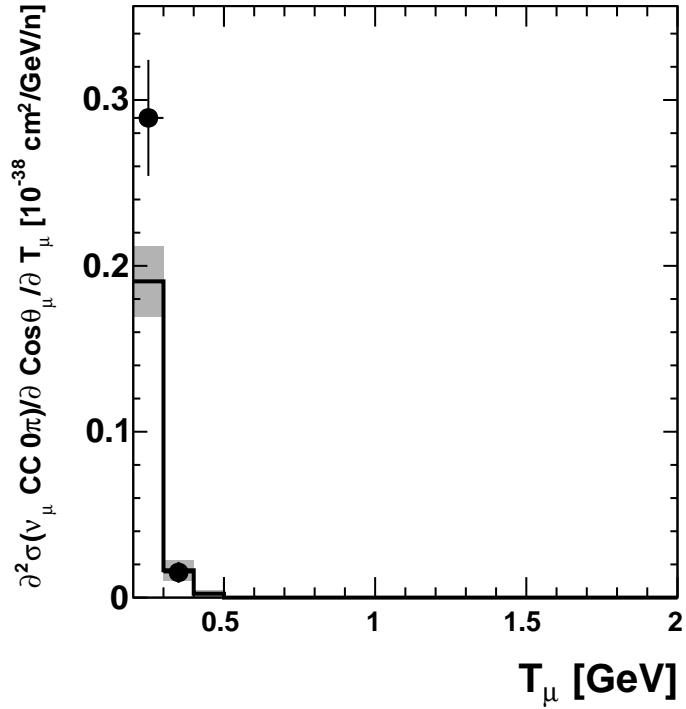
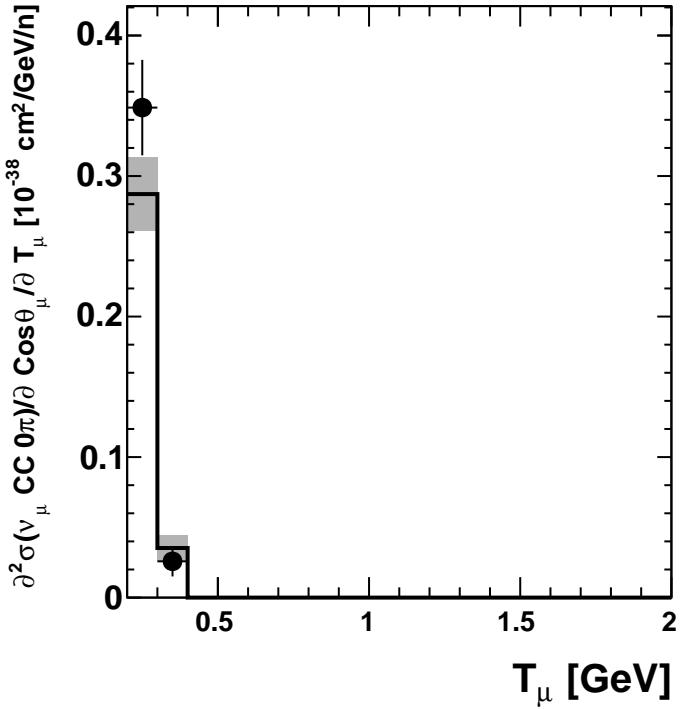
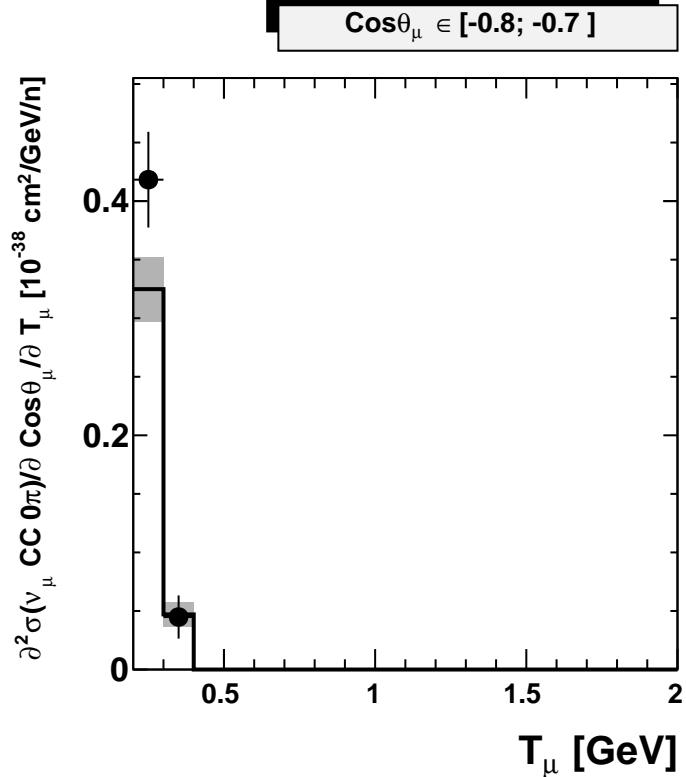
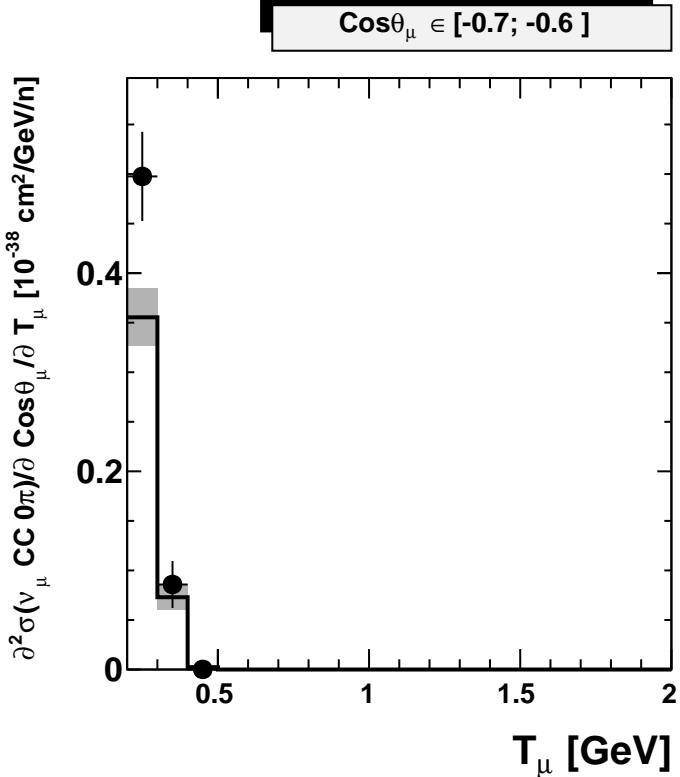
$T_\mu \in [0.6; 0.7] \text{ GeV}$  $T_\mu \in [0.7; 0.8] \text{ GeV}$  $\cos\theta_\mu$  $\cos\theta_\mu$  $T_\mu \in [0.8; 0.9] \text{ GeV}$  $T_\mu \in [0.9; 1] \text{ GeV}$  $\cos\theta_\mu$  $\cos\theta_\mu$

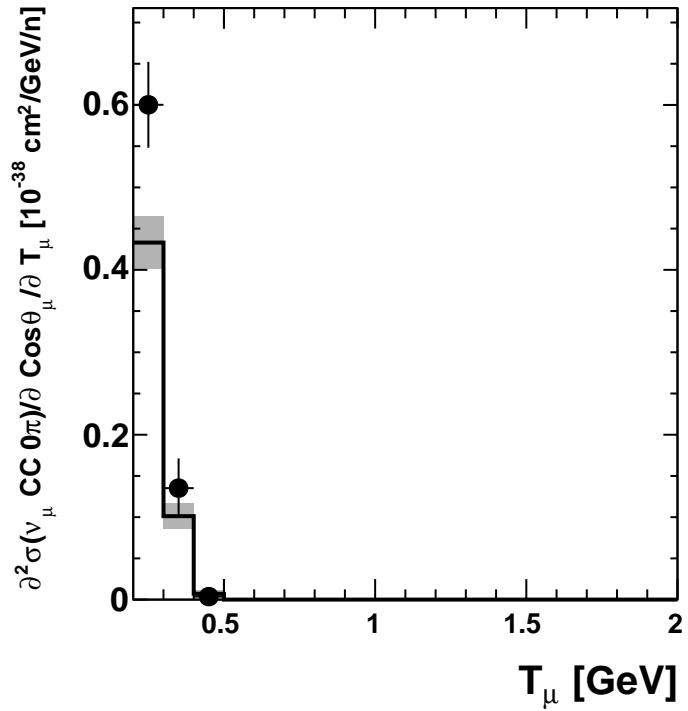
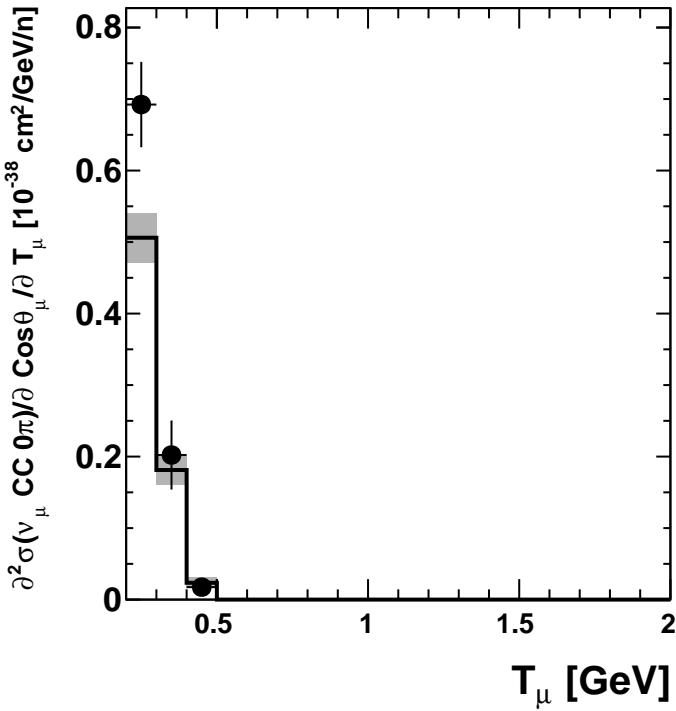
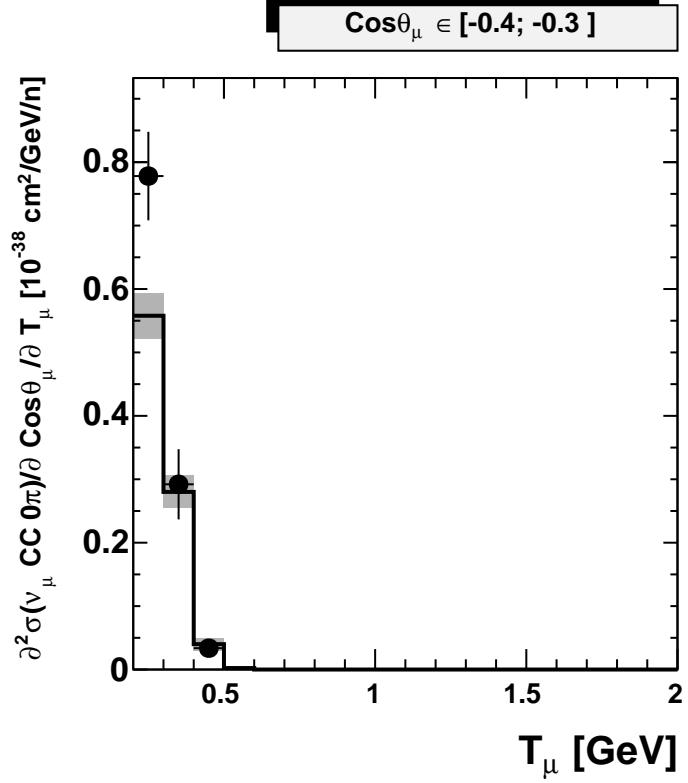
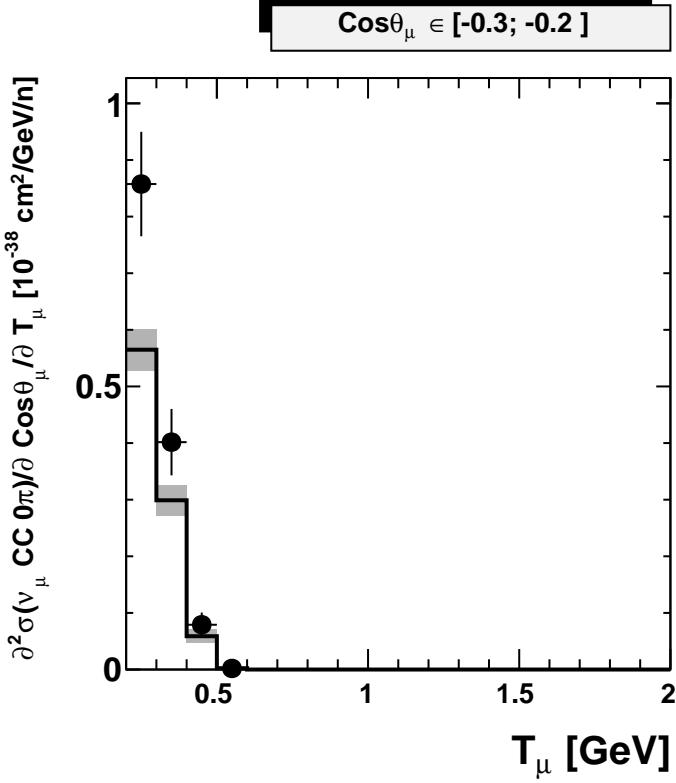
$T_\mu \in [1; 1.1] \text{ GeV}$  $T_\mu \in [1.1; 1.2] \text{ GeV}$  $T_\mu \in [1.2; 1.3] \text{ GeV}$  $T_\mu \in [1.3; 1.4] \text{ GeV}$ 

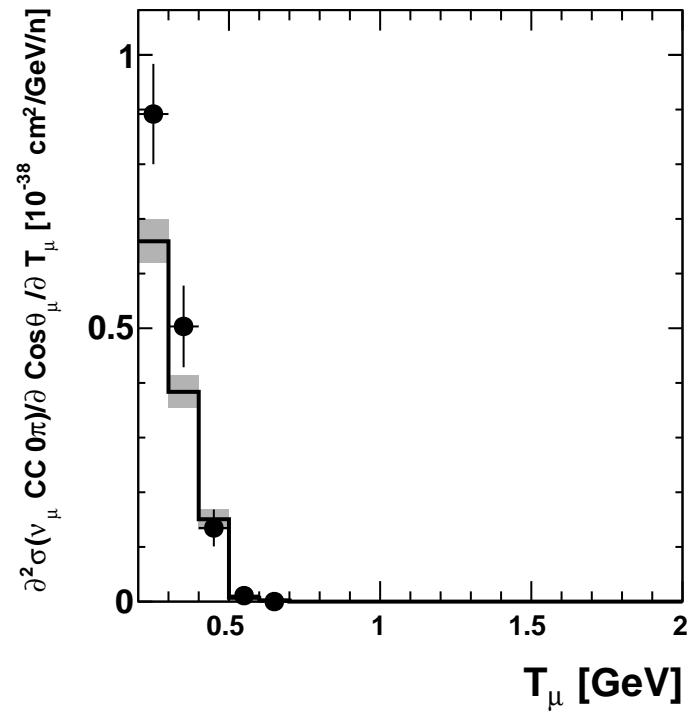
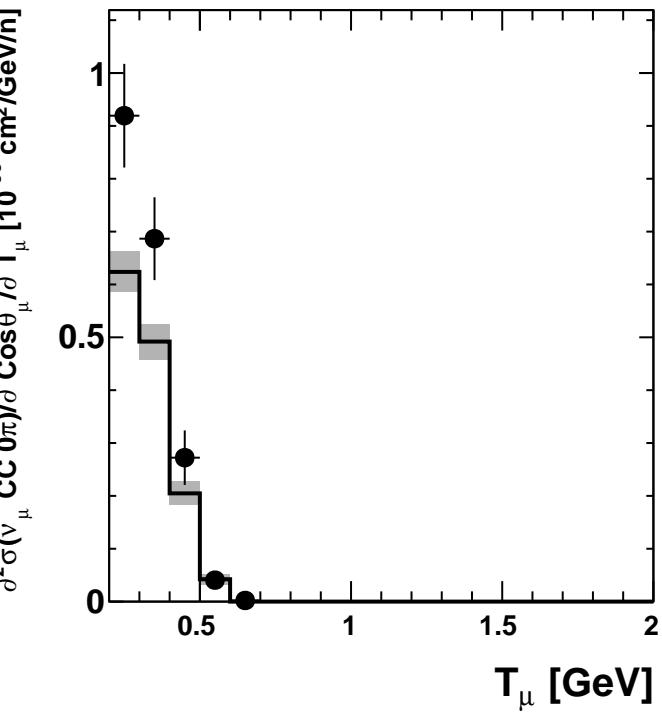
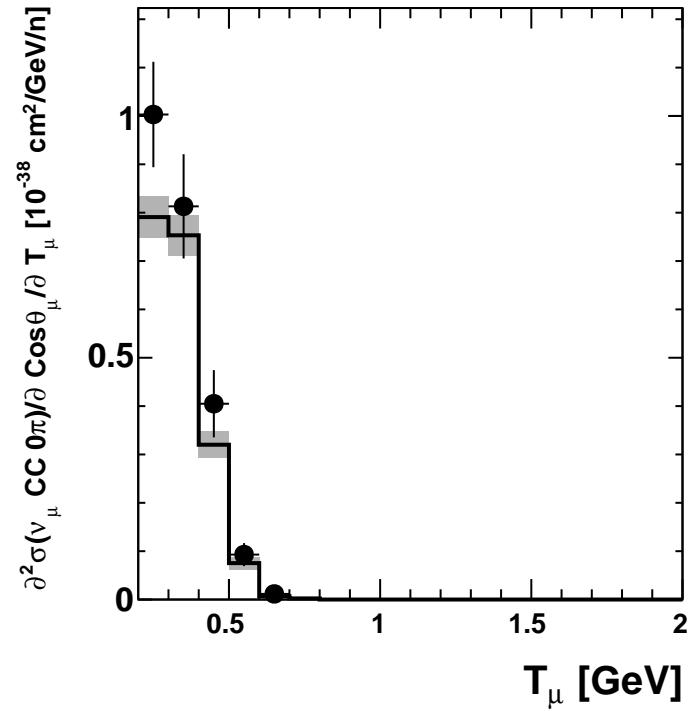
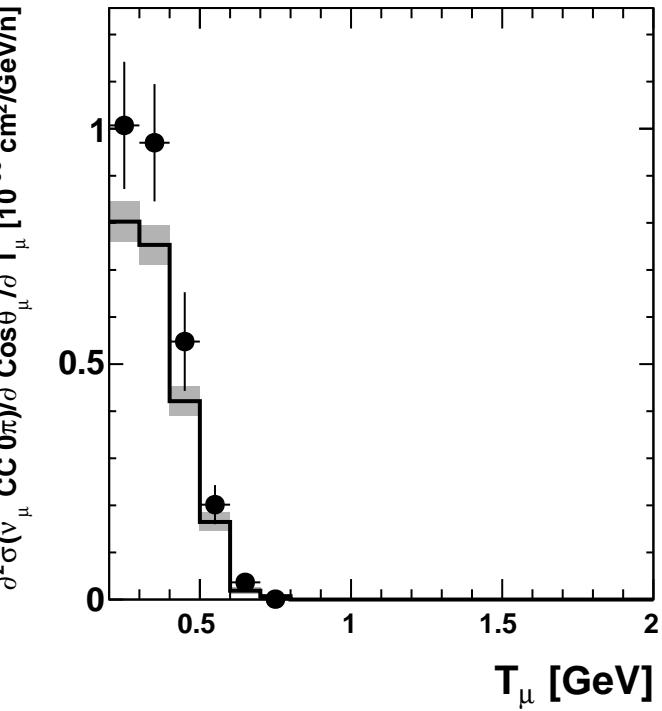
$T_\mu \in [1.4; 1.5] \text{ GeV}$  $T_\mu \in [1.5; 1.6] \text{ GeV}$  $T_\mu \in [1.6; 1.7] \text{ GeV}$  $T_\mu \in [1.7; 1.8] \text{ GeV}$ 

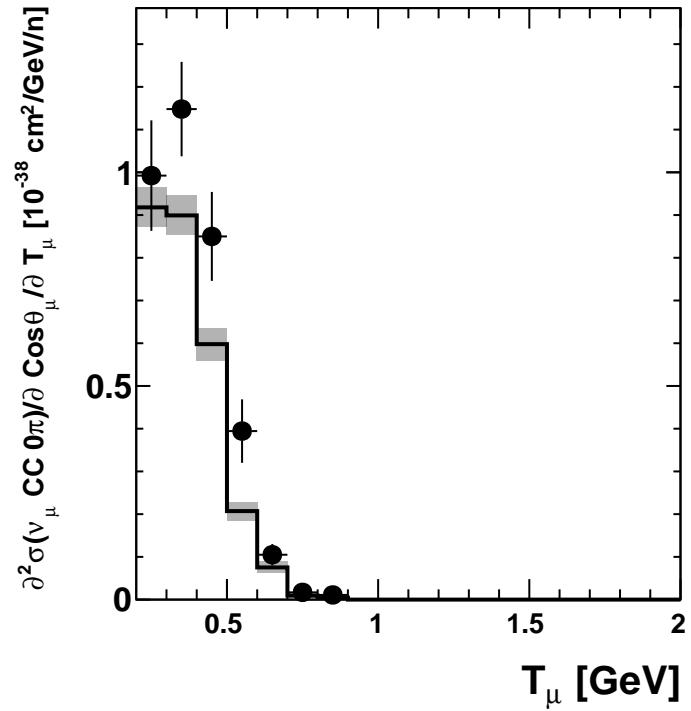
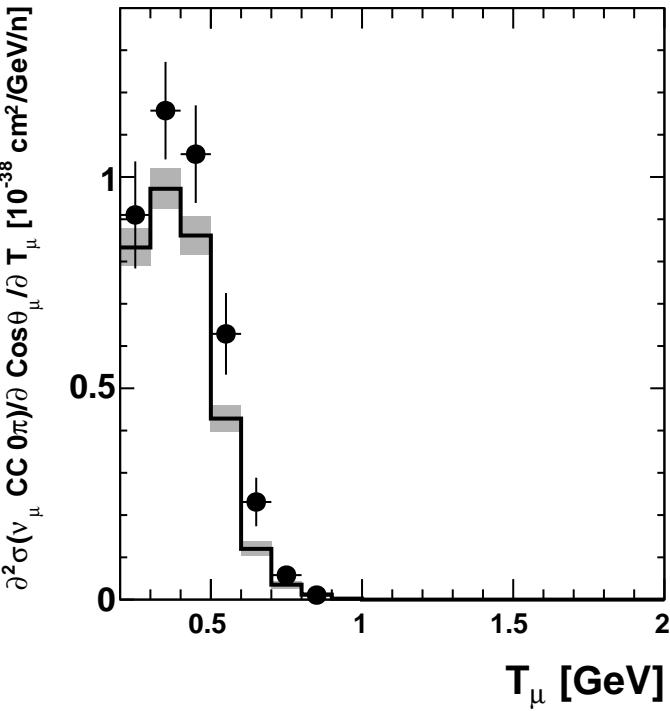
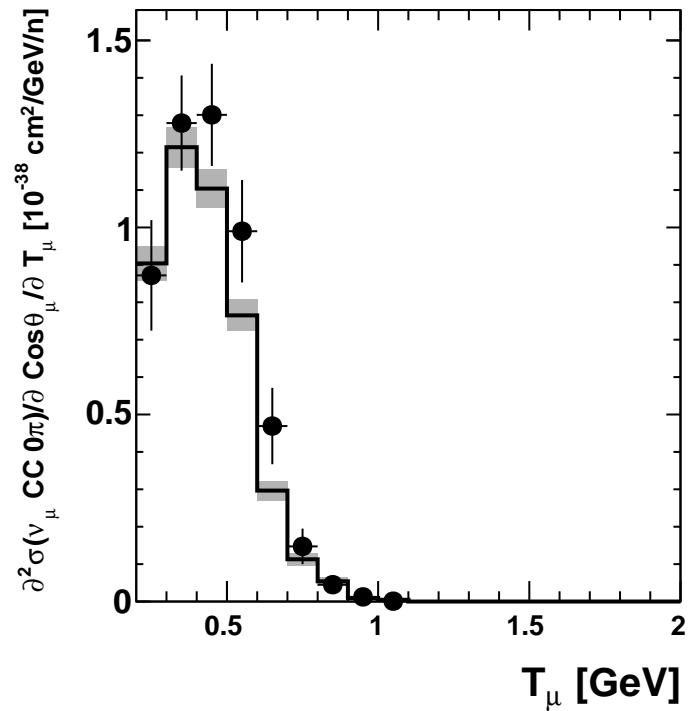
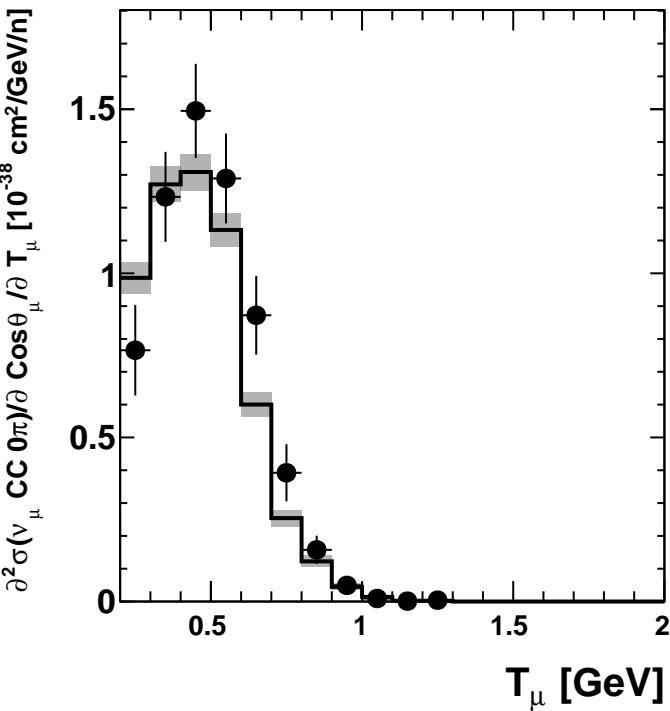
$T_\mu \in [1.8; 1.9] \text{ GeV}$  $T_\mu \in [1.9; 2] \text{ GeV}$ 

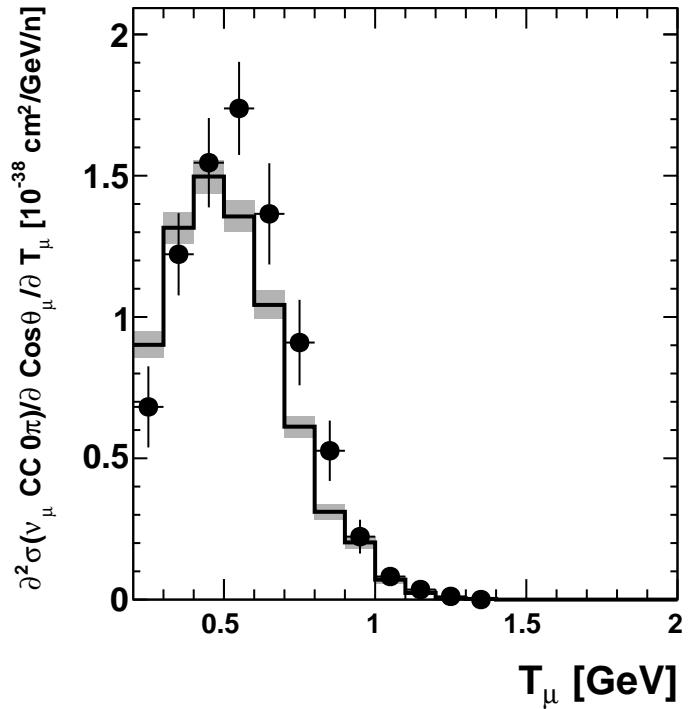
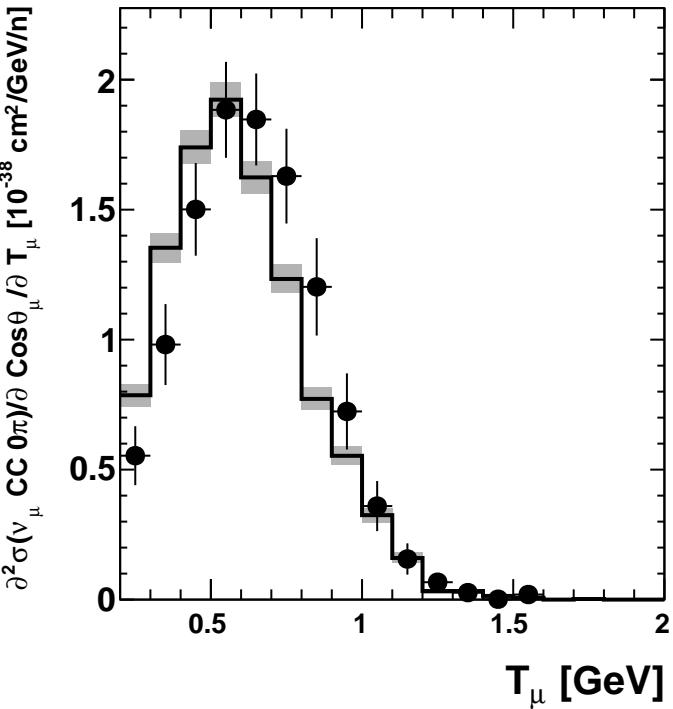
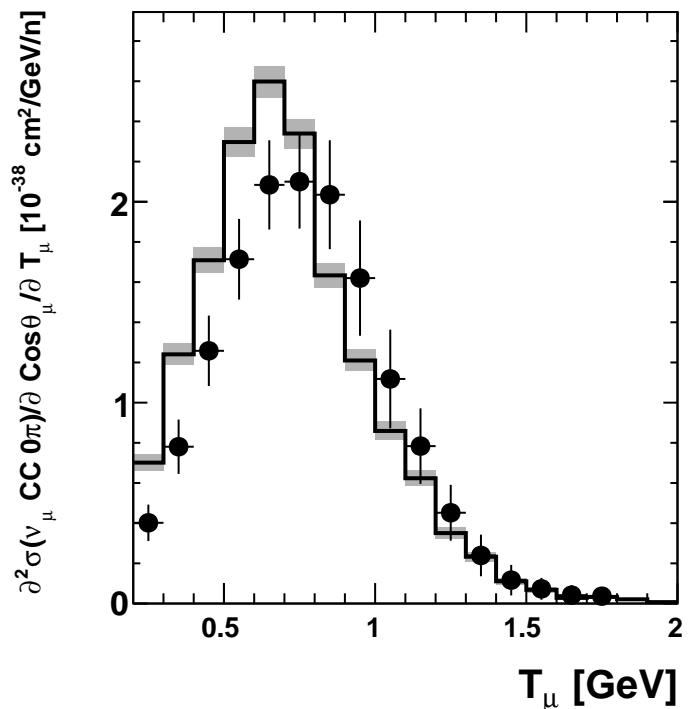
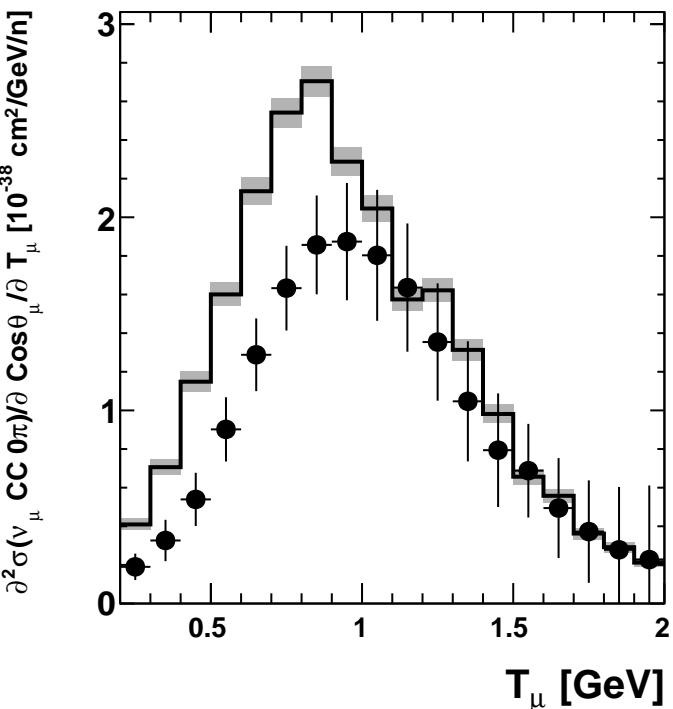


$\text{Cos}\theta_\mu \in [-1; -0.9]$  $\text{Cos}\theta_\mu \in [-0.9; -0.8]$  $\text{Cos}\theta_\mu \in [-0.8; -0.7]$  $\text{Cos}\theta_\mu \in [-0.7; -0.6]$ 

$\text{Cos}\theta_\mu \in [-0.6; -0.5]$  $\text{Cos}\theta_\mu \in [-0.5; -0.4]$  $\text{Cos}\theta_\mu \in [-0.4; -0.3]$  $\text{Cos}\theta_\mu \in [-0.3; -0.2]$ 

$\text{Cos}\theta_\mu \in [-0.2; -0.1]$  $\text{Cos}\theta_\mu \in [-0.1; 0]$  $\text{Cos}\theta_\mu \in [0; 0.1]$  $\text{Cos}\theta_\mu \in [0.1; 0.2]$ 

$\text{Cos}\theta_\mu \in [0.2; 0.3]$  $\text{Cos}\theta_\mu \in [0.3; 0.4]$  $\text{Cos}\theta_\mu \in [0.4; 0.5]$  $\text{Cos}\theta_\mu \in [0.5; 0.6]$ 

$\text{Cos}\theta_\mu \in [0.6; 0.7]$  $\text{Cos}\theta_\mu \in [0.7; 0.8]$  $\text{Cos}\theta_\mu \in [0.8; 0.9]$  $\text{Cos}\theta_\mu \in [0.9; 1]$ 



**Dataset:**  
**miniboone\_nucc1pi0\_2010**

**Model:**  
**master/G18\_02a\_00\_000  $\chi^2 = 168 / 74$  DoF**

**Plots:**  
 $\sigma(v_\mu + X \rightarrow \mu^- + \pi^0 + Y)$   
**14 DoF,  $\chi^2 = 22.3$**

$d\sigma(CC 1\pi^0)/d\cos\theta_\mu$   
**9 DoF,  $\chi^2 = 37.6$**

$d\sigma(CC 1\pi^0)/d\cos\theta_{\pi^0}$   
**15 DoF,  $\chi^2 = 18.5$**

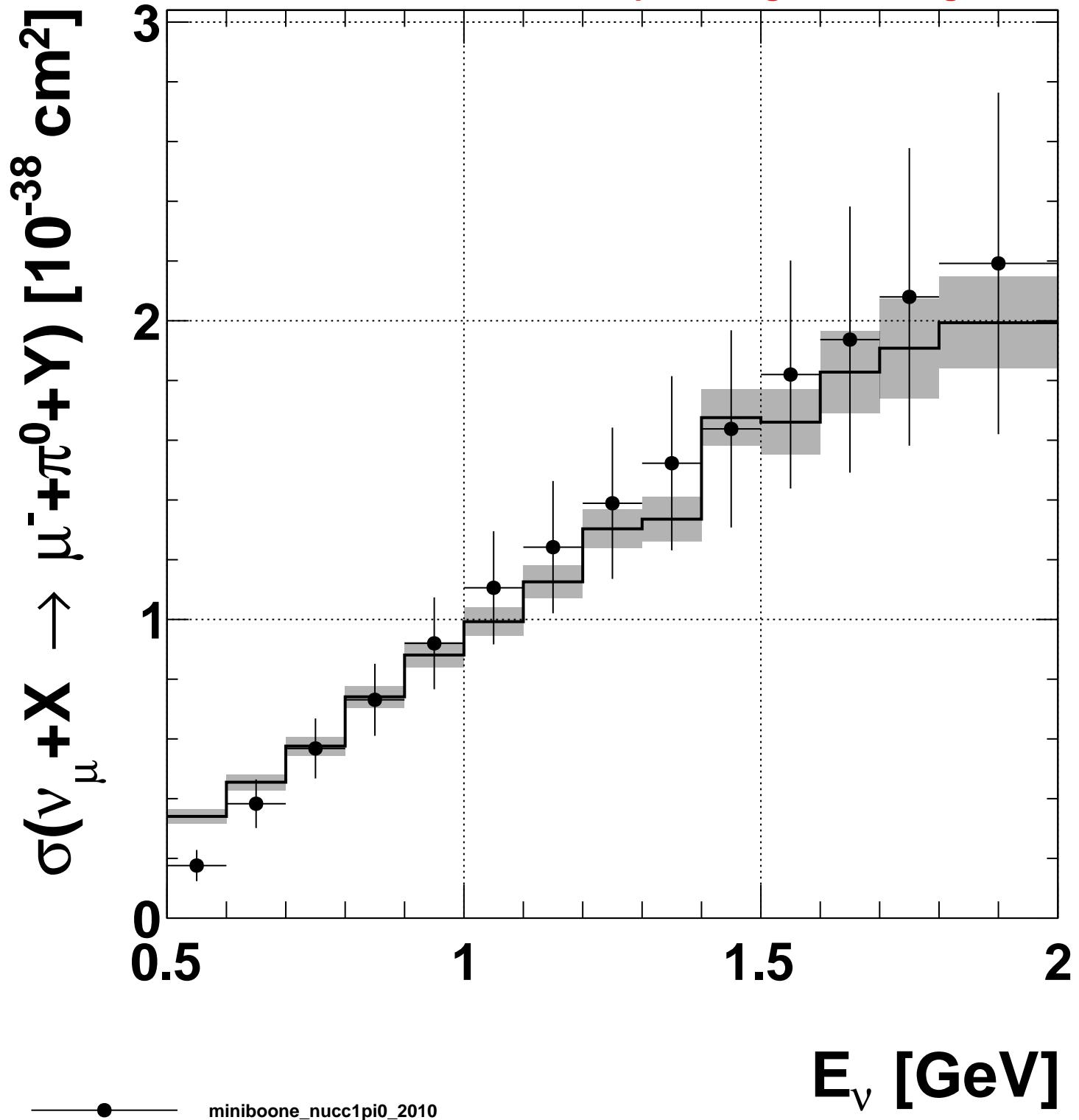
$d\sigma(CC 1\pi^0)/dP_{\pi^0}$   
**11 DoF,  $\chi^2 = 32.2$**

$d\sigma(CC 1\pi^0)/dQ^2$   
**12 DoF,  $\chi^2 = 35.1$**

$d\sigma(CC 1\pi^0)/dT_\mu$   
**13 DoF,  $\chi^2 = 22.4$**

**2018/10/15 09:39:59**

© 2003-2018, GENIE - <http://www.genie-mc.org>

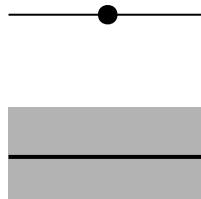
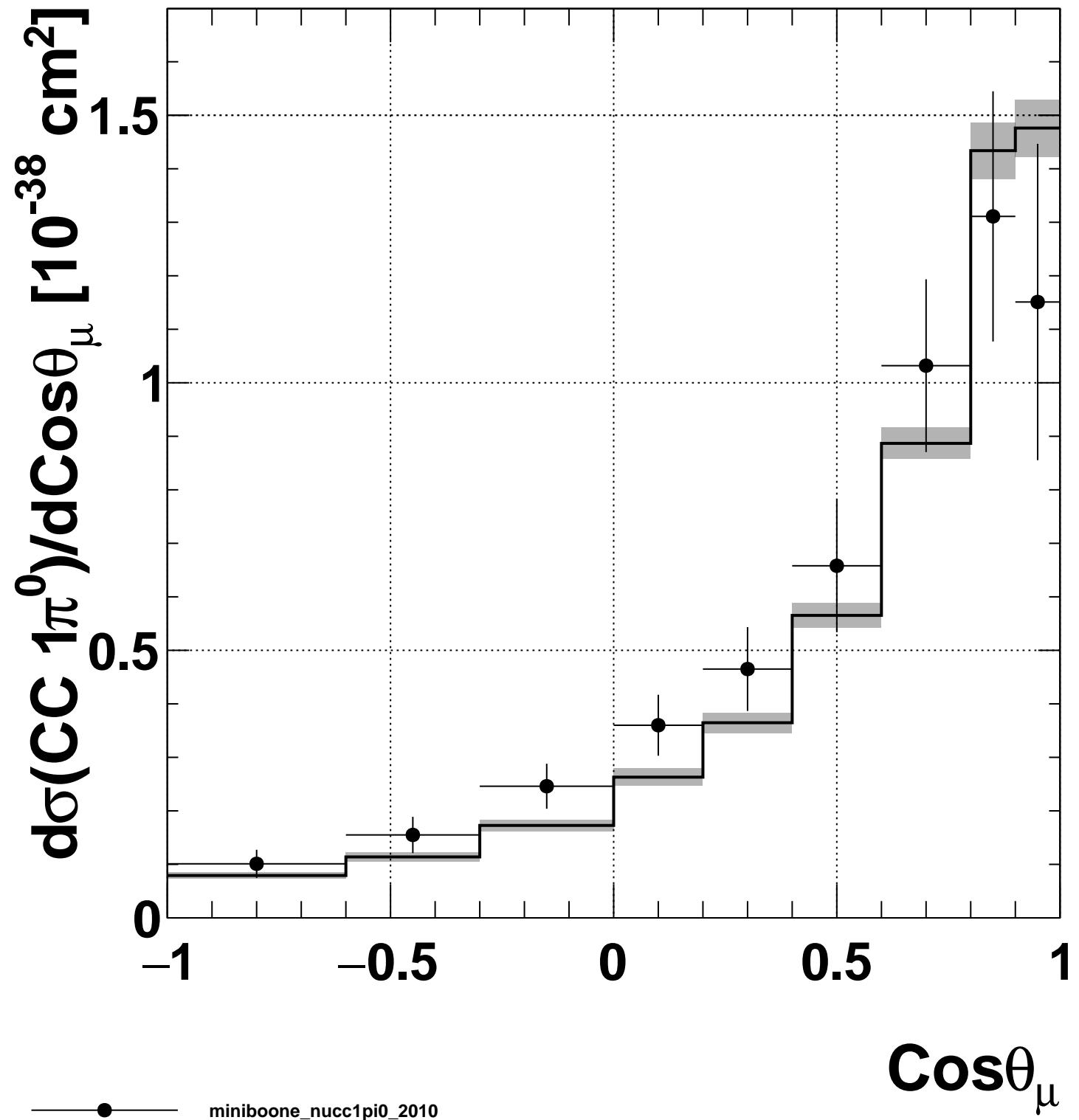


miniboone\_nucc1pi0\_2010

$E_\nu [\text{GeV}]$

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 22.3/14 \text{ DoF}$

© 2003-2018, GENIE - <http://www.genie-mc.org>

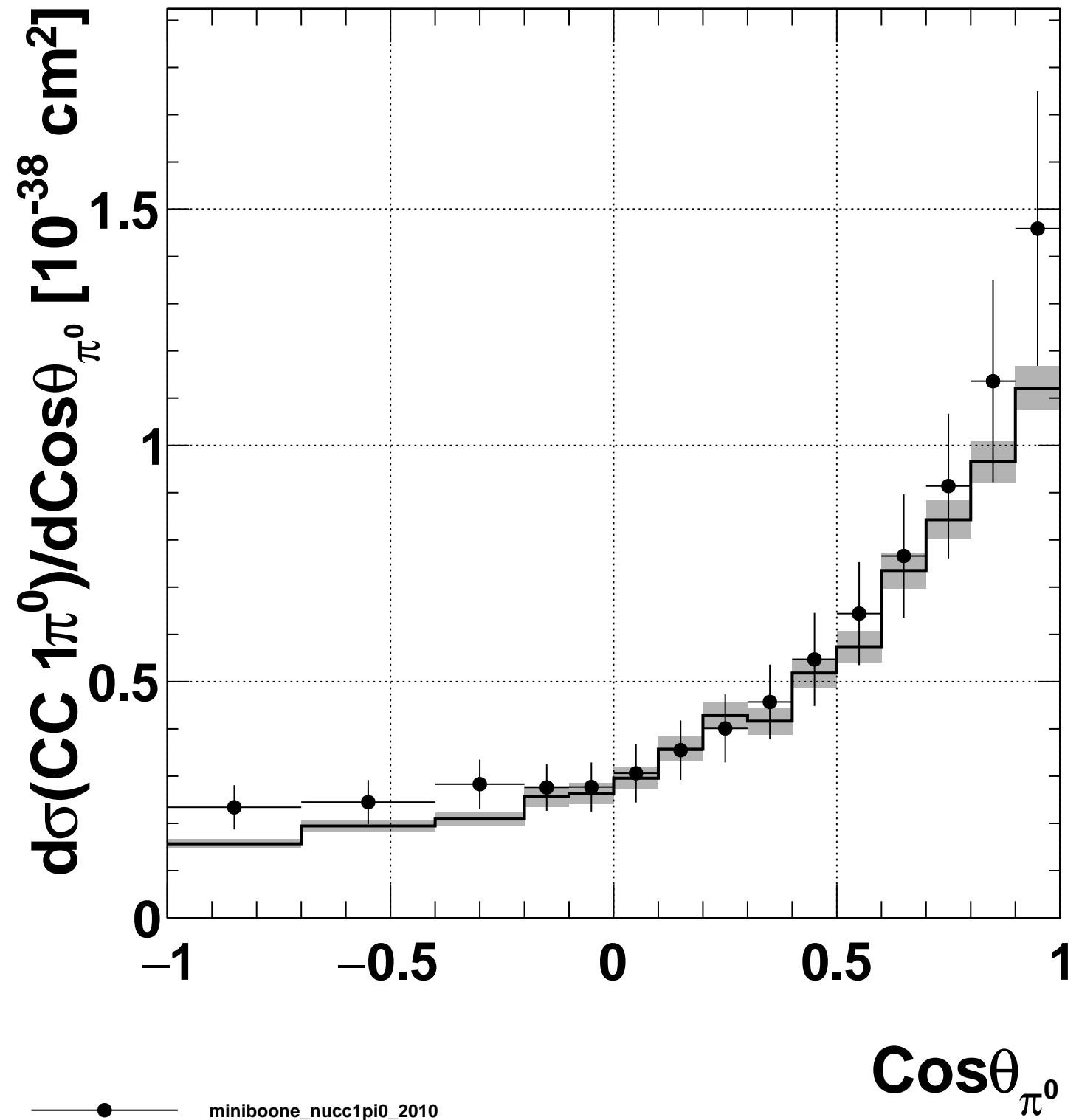


miniboone\_nucc1pi0\_2010

$\cos\theta_\mu$

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 37.6/9$  DoF

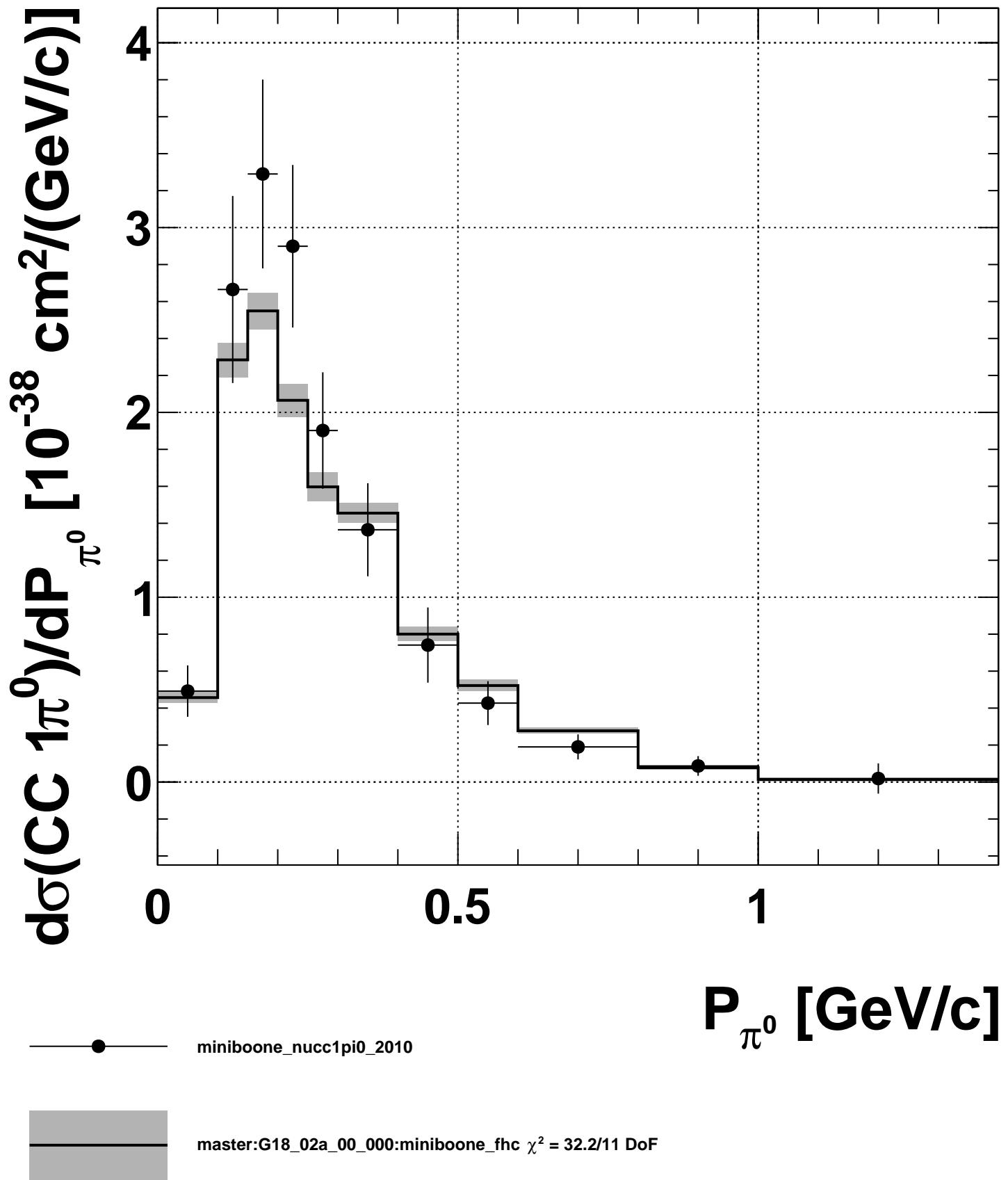
© 2003-2018, GENIE - <http://www.genie-mc.org>

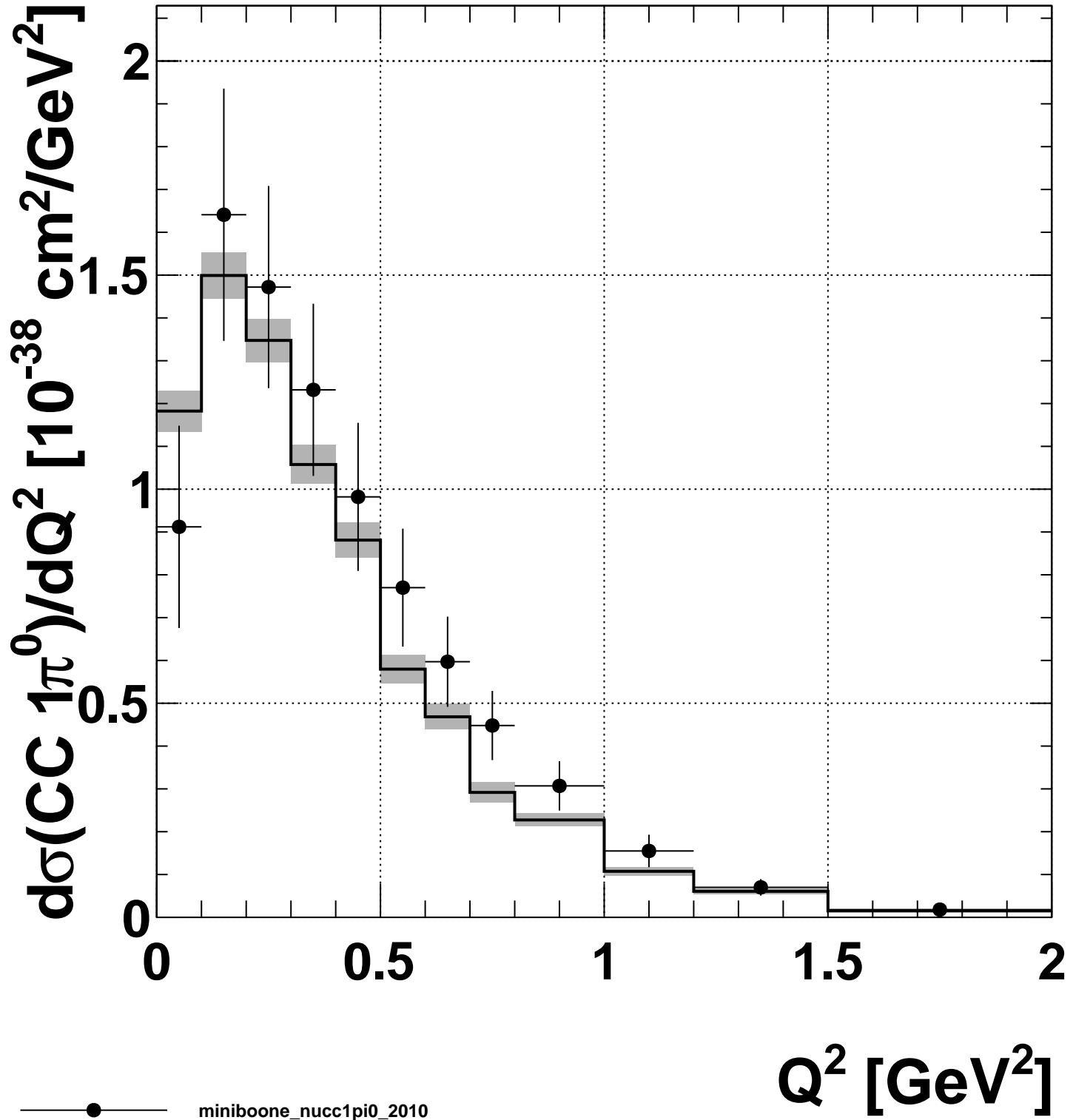


miniboone\_nucc1pi0\_2010

**Cosθ<sub>π<sup>0</sup></sub>**

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 18.5/15$  DoF

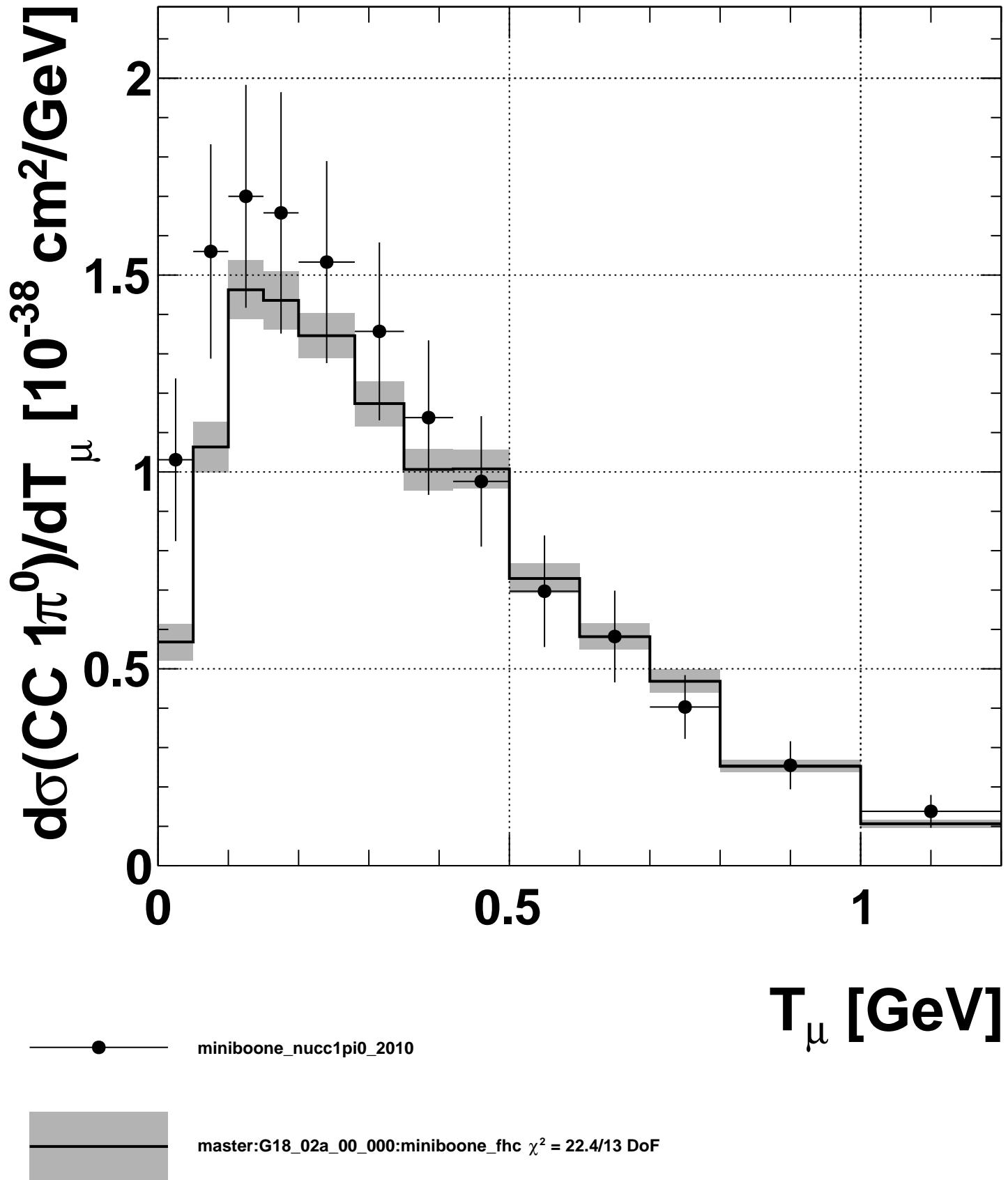




miniboone\_nucc1pi0\_2010

$Q^2 [\text{GeV}^2]$

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 35.1/12$  DoF



**Dataset:**  
**miniboone\_nucc1pip\_2011**

**Model:**  
master/G18\_02a\_00\_000  $\chi^2 = 1.77e+03 / 1440$  DoF

**Plots:**  
 $\sigma(v_\mu + X \rightarrow \mu^- + \pi^+ + Y)$   
**27 DoF,  $\chi^2 = 62.3$**

$\partial^2 \sigma / \partial \cos\theta_\mu / \partial T_\mu$   
**233 DoF,  $\chi^2 = 130$**

$\partial^2 \sigma / \partial \cos\theta_\pi / \partial T_\pi$   
**154 DoF,  $\chi^2 = 88.8$**

$d\sigma/dQ^2$   
**23 DoF,  $\chi^2 = 12.6$**

$d\sigma/dQ^2$   
**351 DoF,  $\chi^2 = 472$**

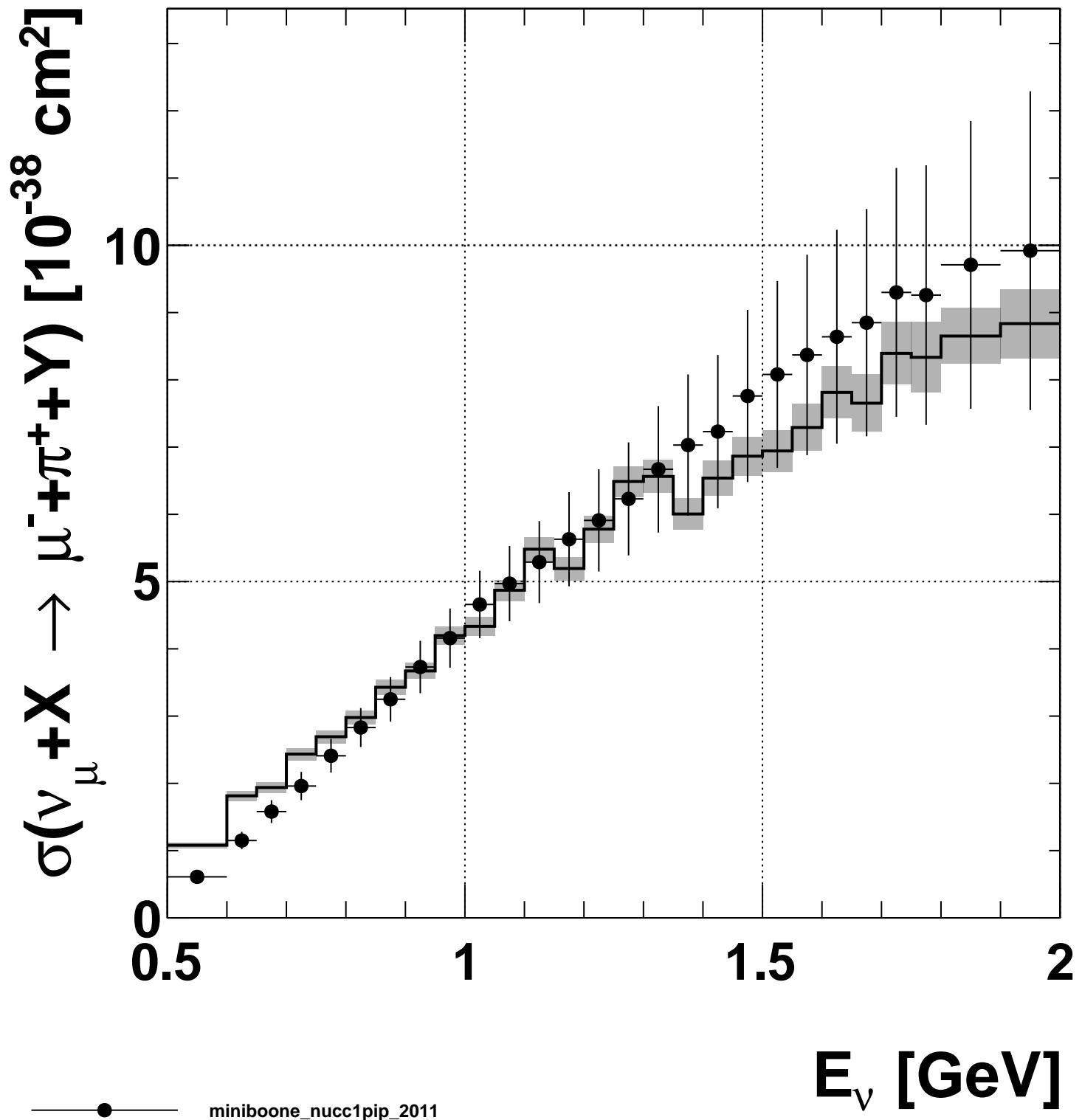
$d\sigma/dT_\mu$   
**23 DoF,  $\chi^2 = 3.42$**

$d\sigma/dT_\mu$   
**303 DoF,  $\chi^2 = 559$**

$d\sigma/dT_\pi$   
**15 DoF,  $\chi^2 = 26.9$**

$d\sigma/dT_\pi$   
**311 DoF,  $\chi^2 = 415$**

© 2003-2018, GENIE - <http://www.genie-mc.org>

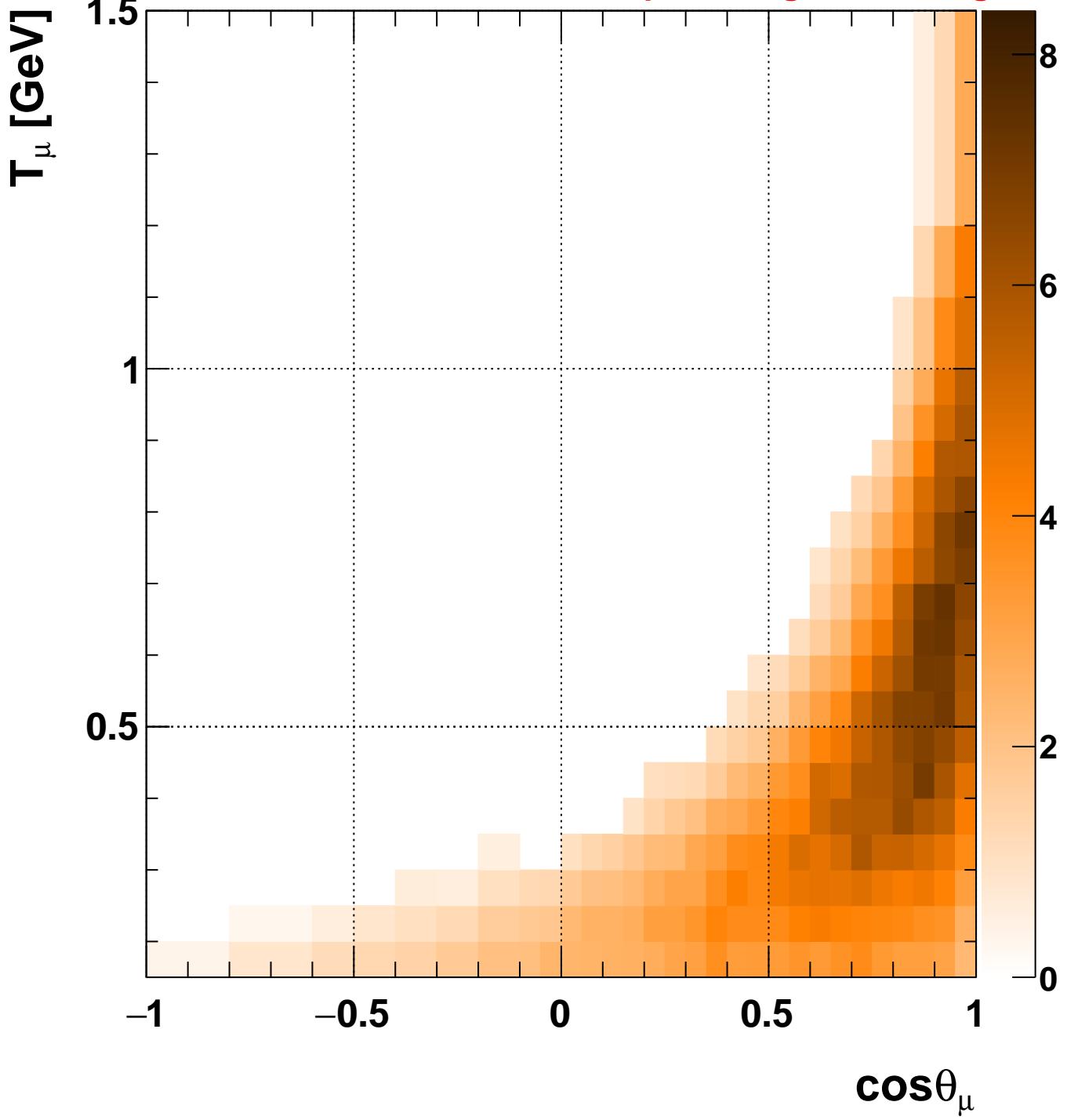


miniboone\_nucc1pip\_2011

$E_\nu$  [GeV]

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 62.3/27$  DoF

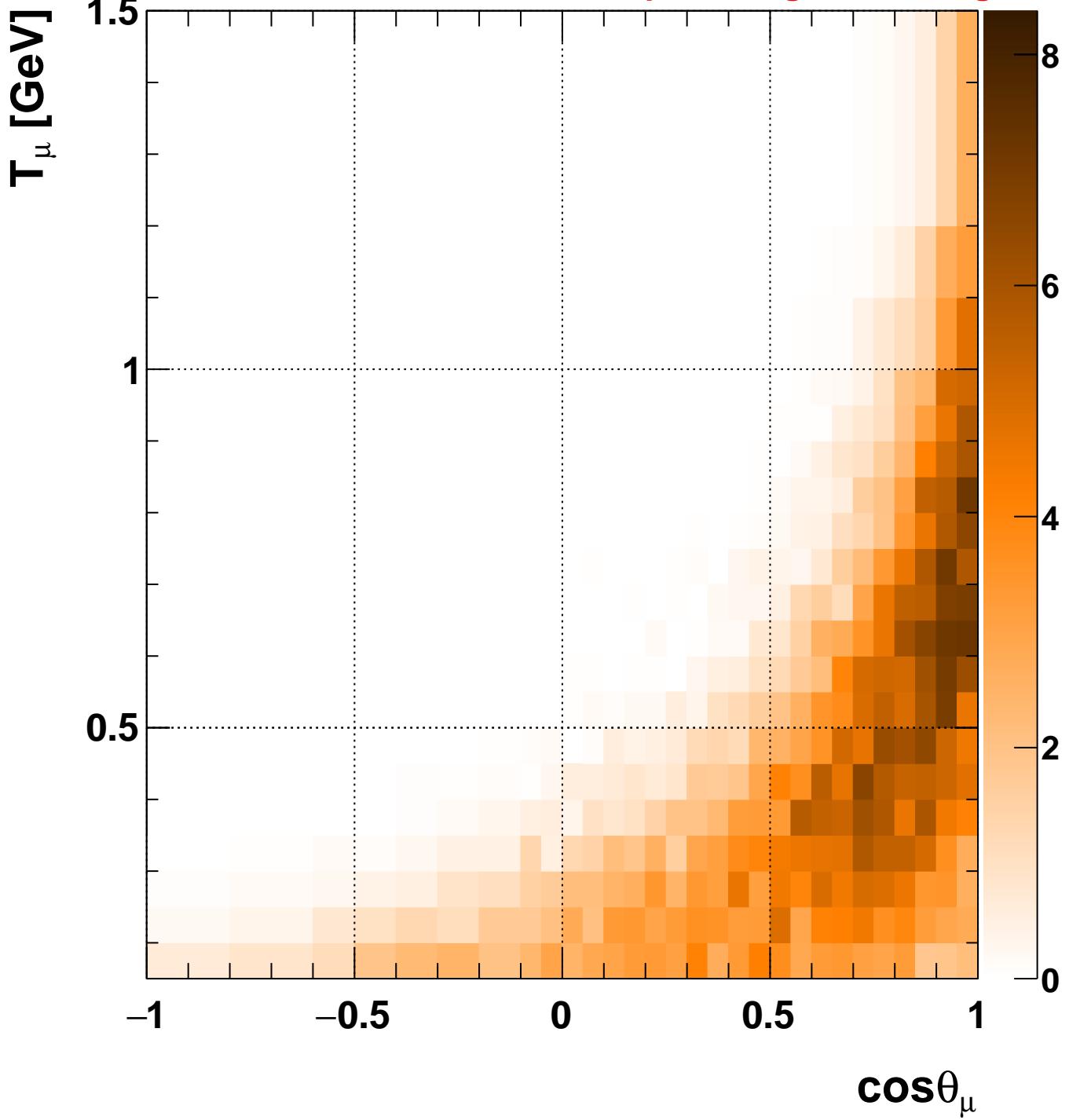
© 2003-2018, GENIE - <http://www.genie-mc.org>



$\partial^2\sigma/\partial \cos\theta_\mu/\partial T_\mu [10^{-38} \text{ cm}^2/\text{GeV}]$

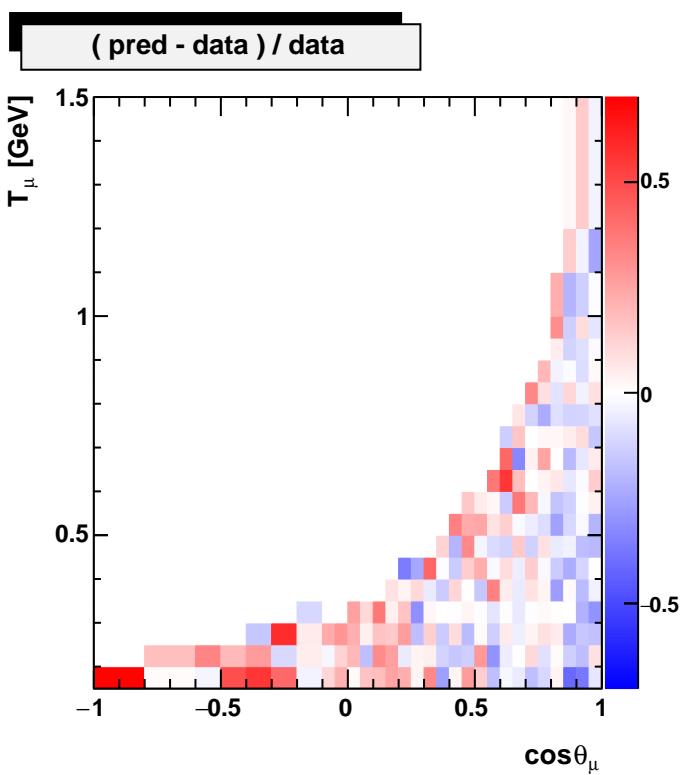
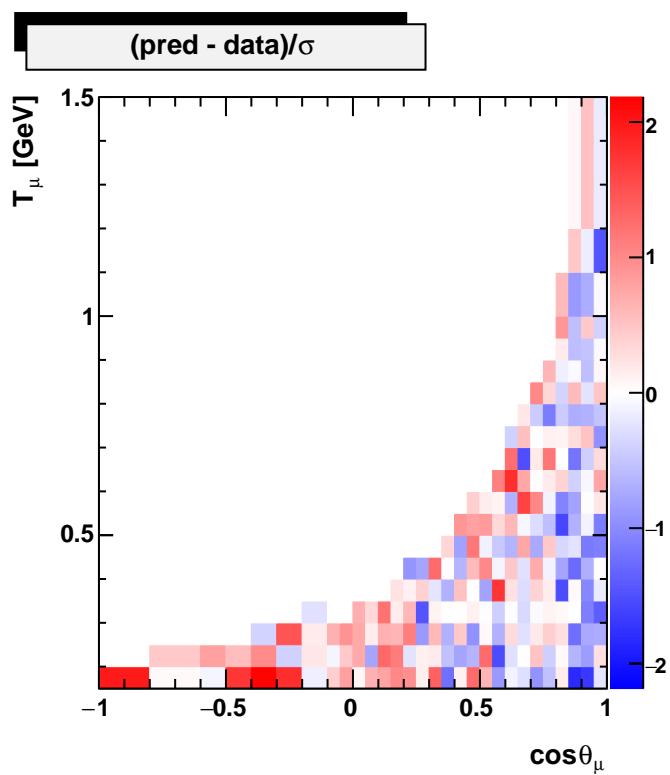
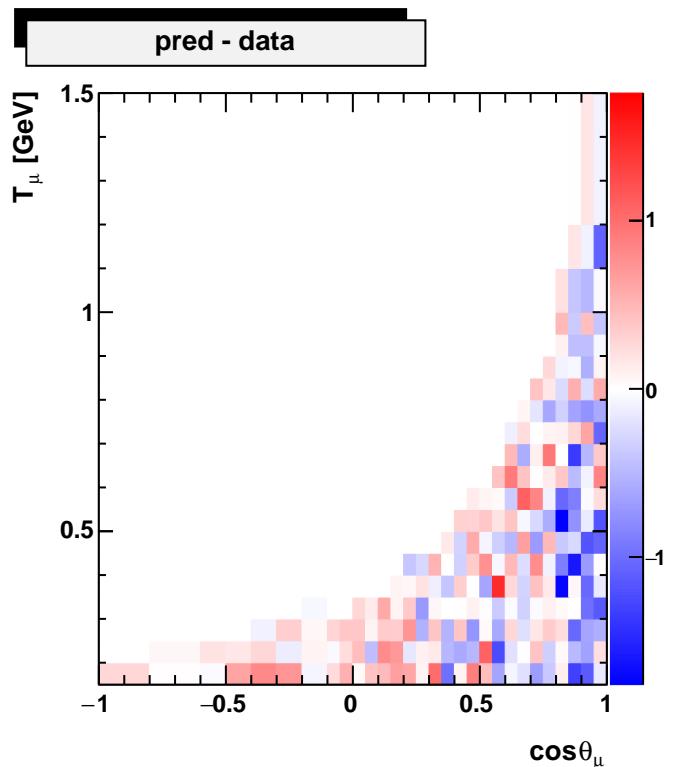
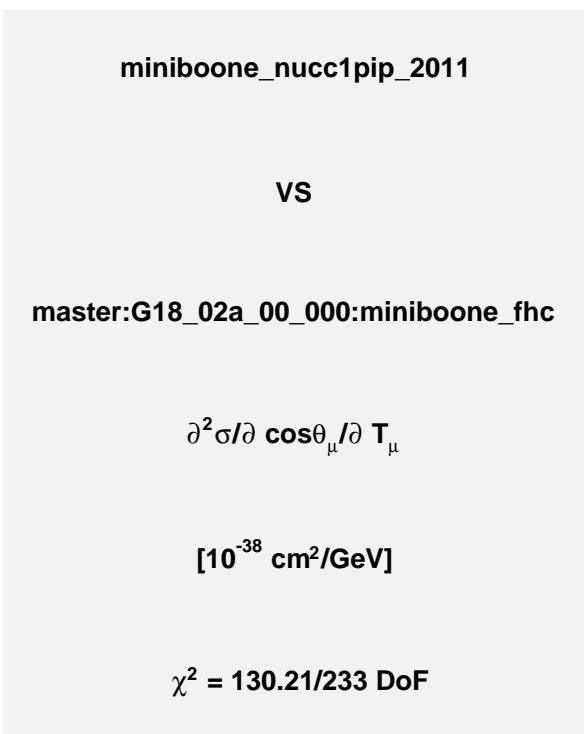
Data: miniboone\_nucc1pip\_2011

© 2003-2018, GENIE - <http://www.genie-mc.org>

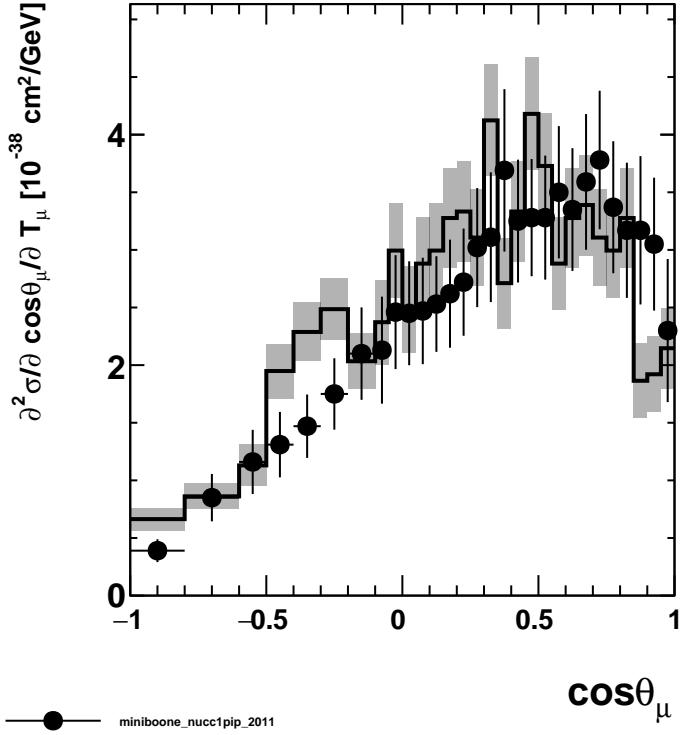
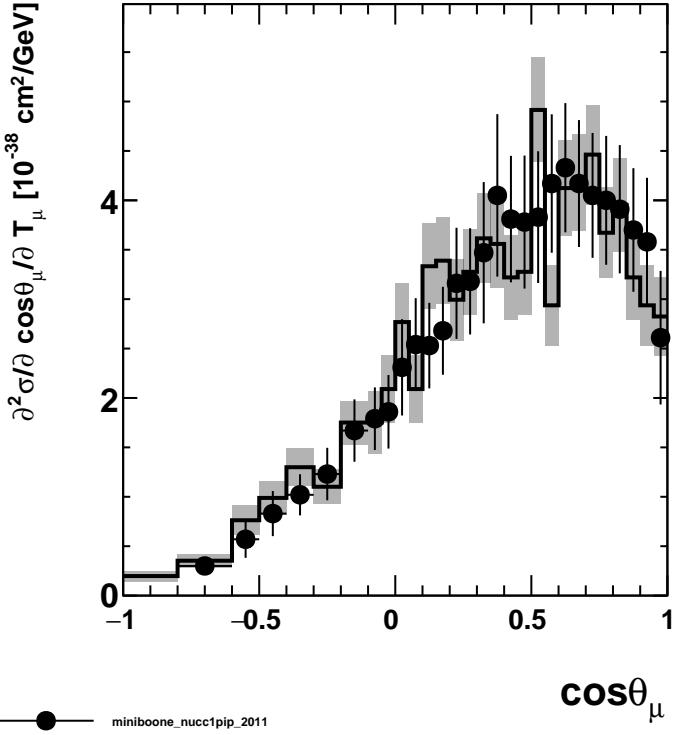
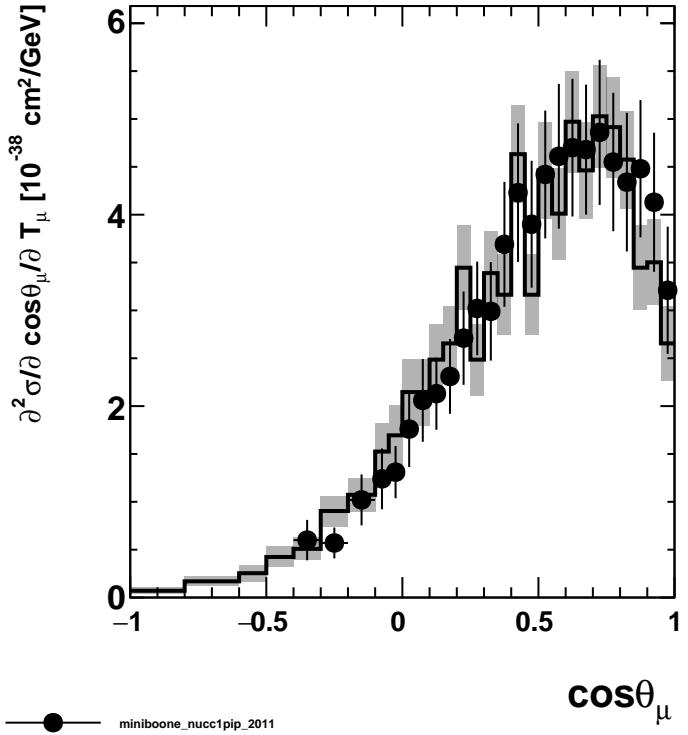
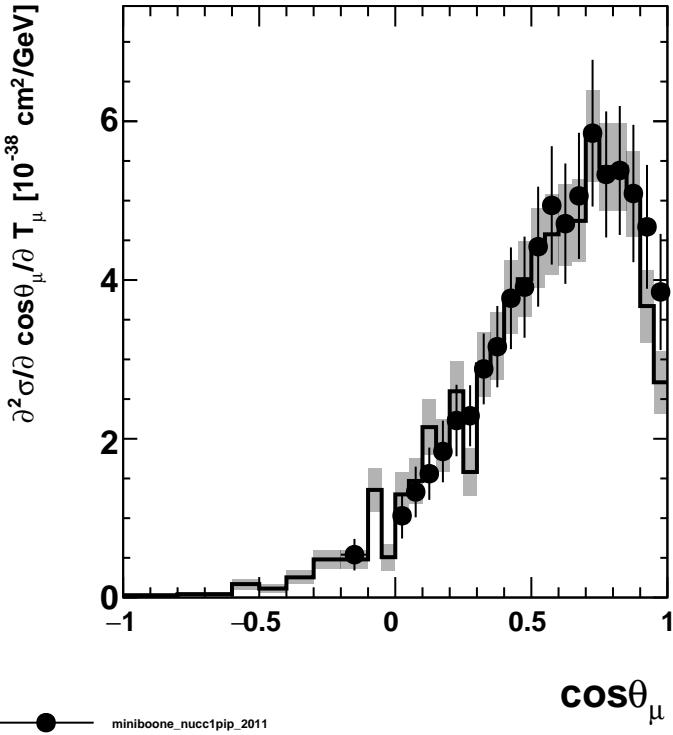


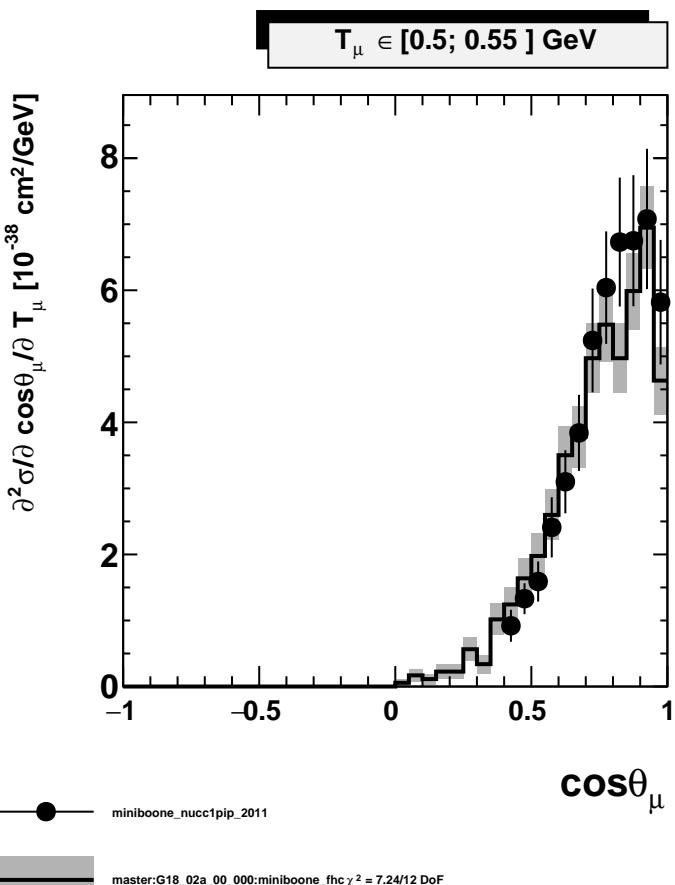
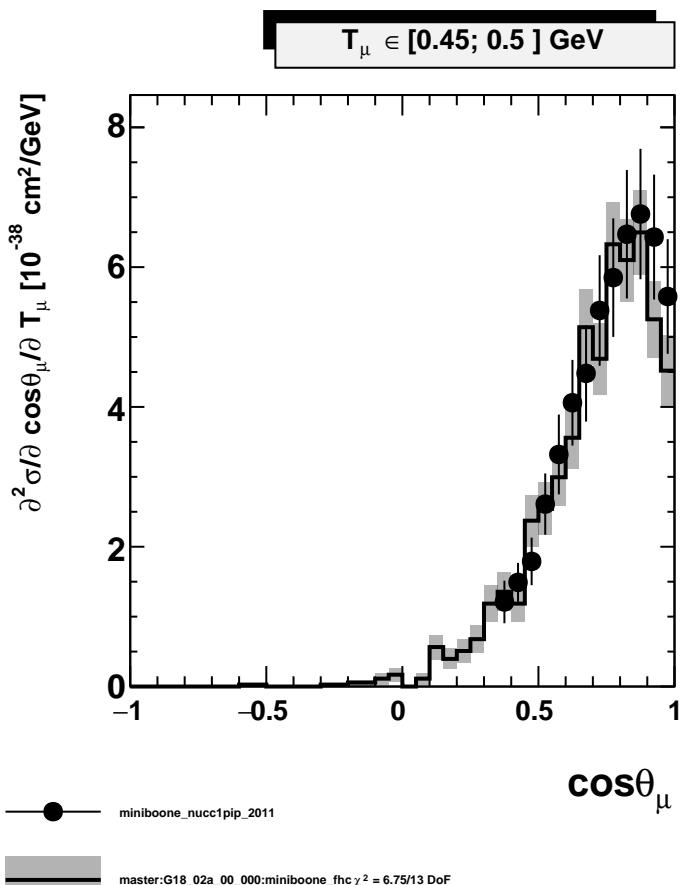
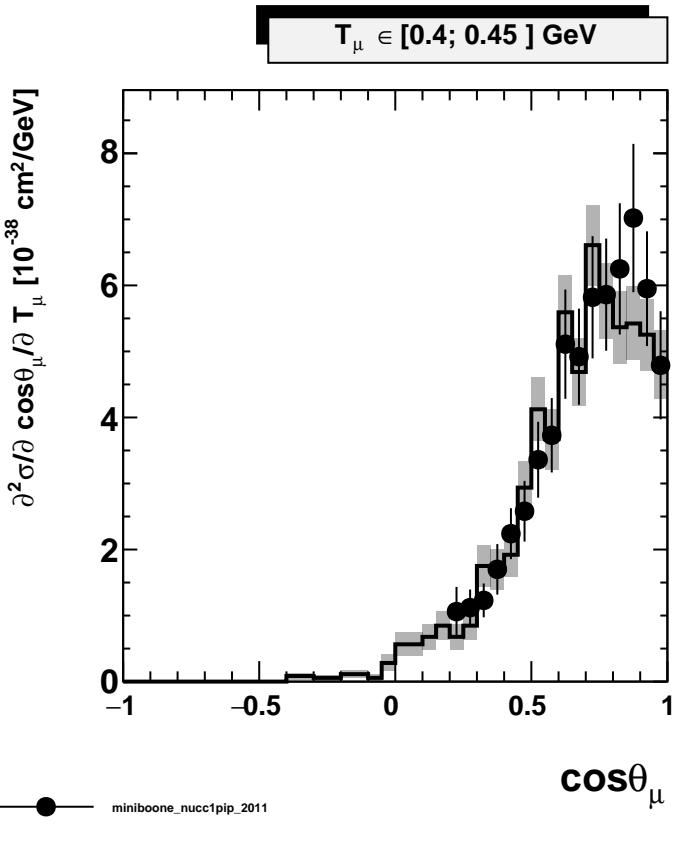
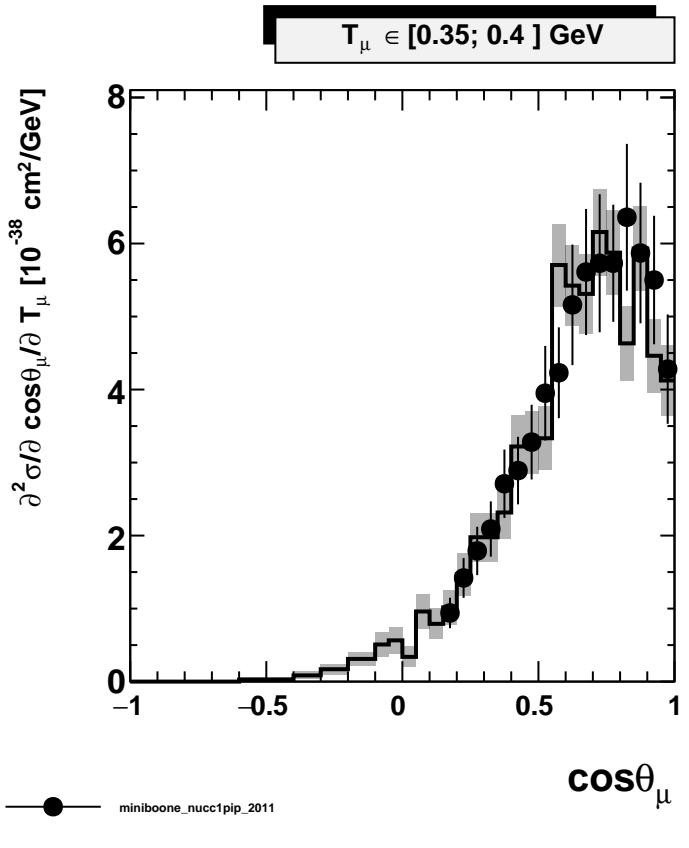
$$\partial^2 \sigma / \partial \cos\theta_\mu / \partial T_\mu [10^{-38} \text{ cm}^2/\text{GeV}]$$

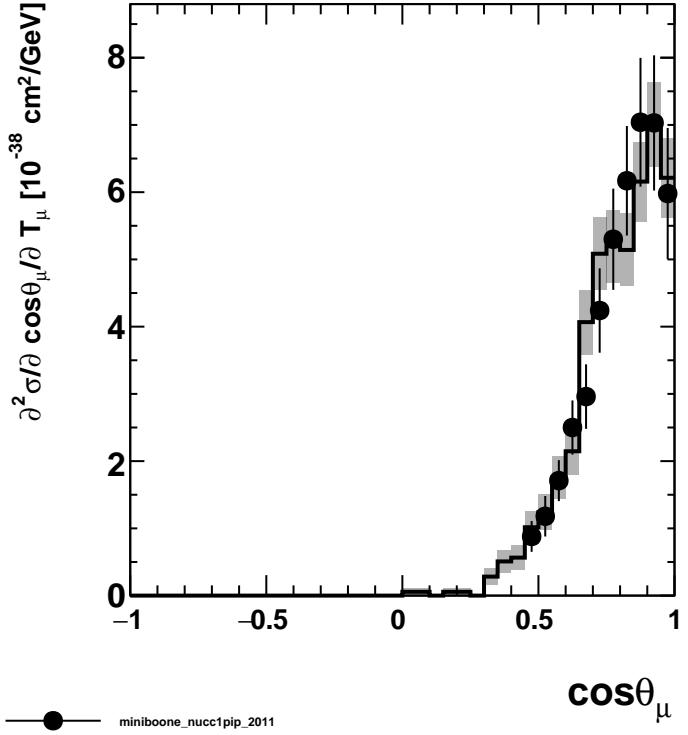
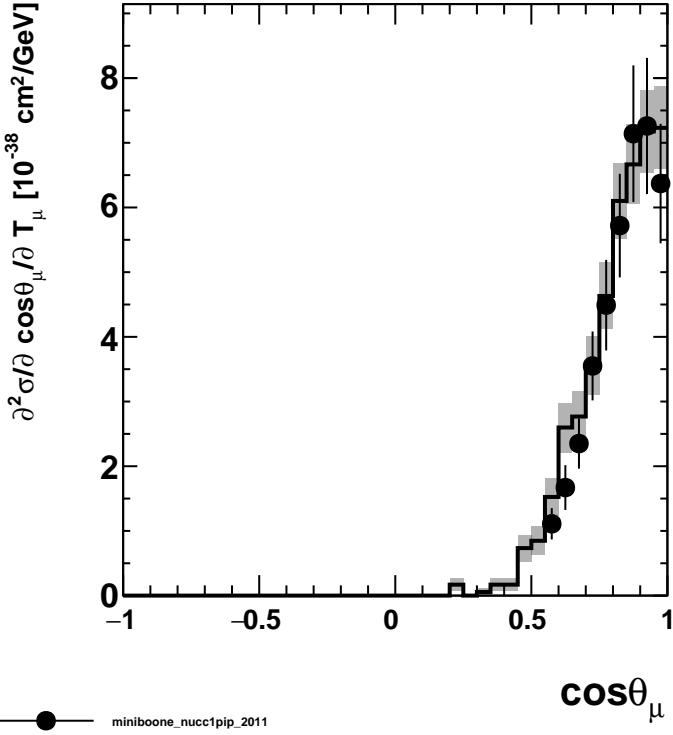
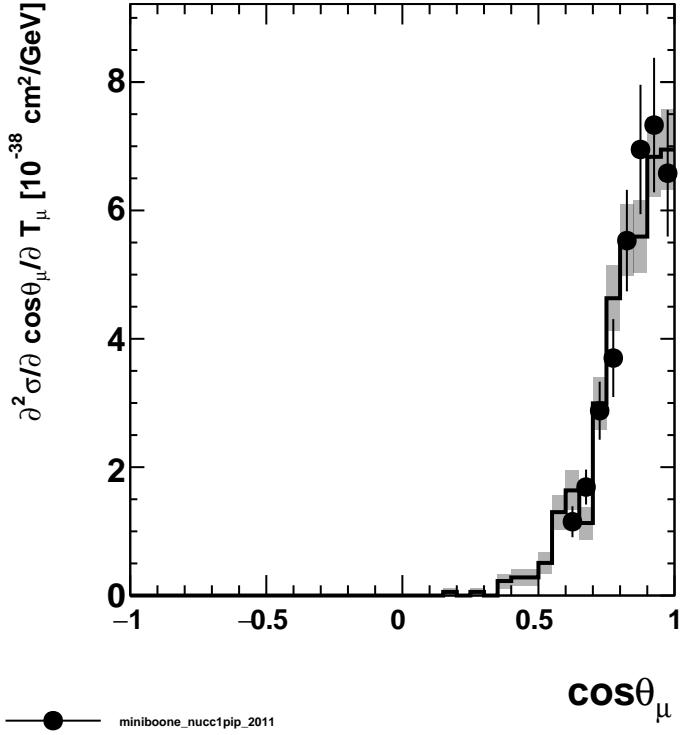
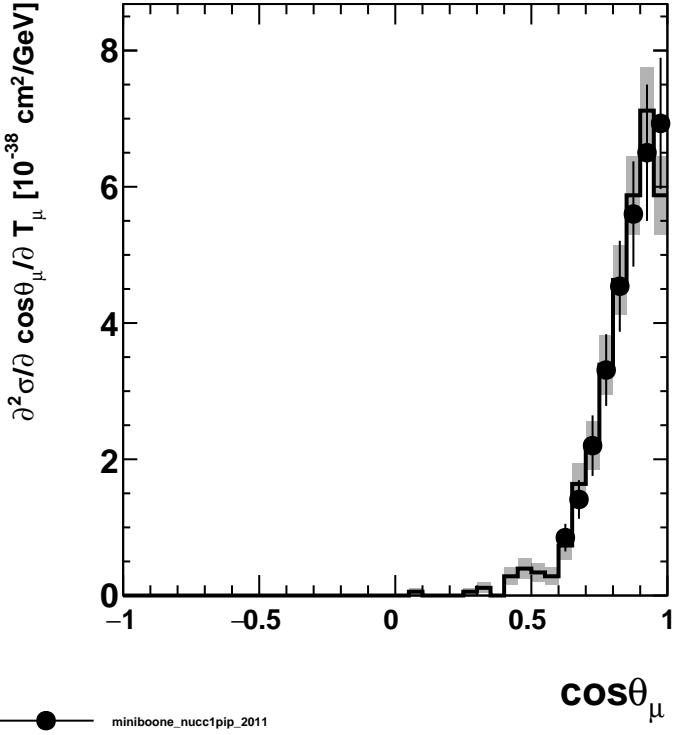
Pred: master:G18\_02a\_00\_000:miniboone\_fhc

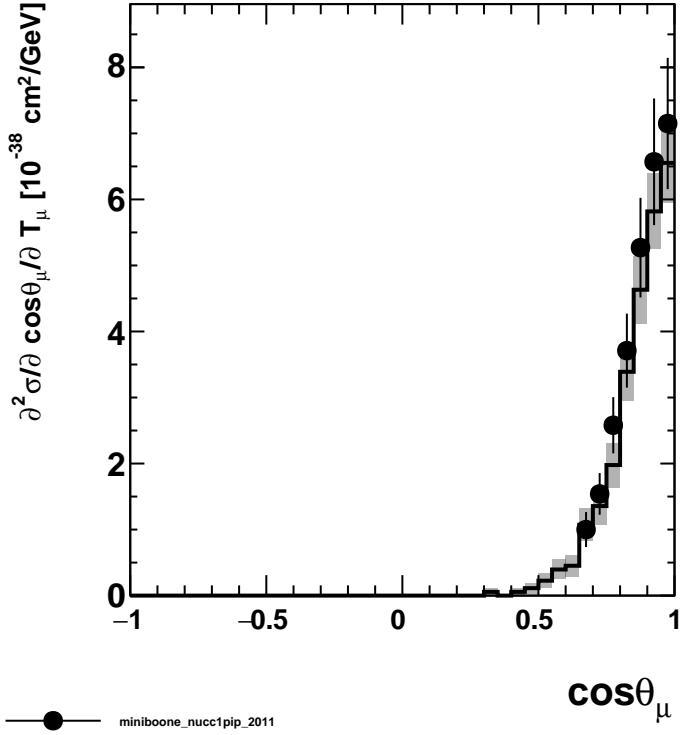
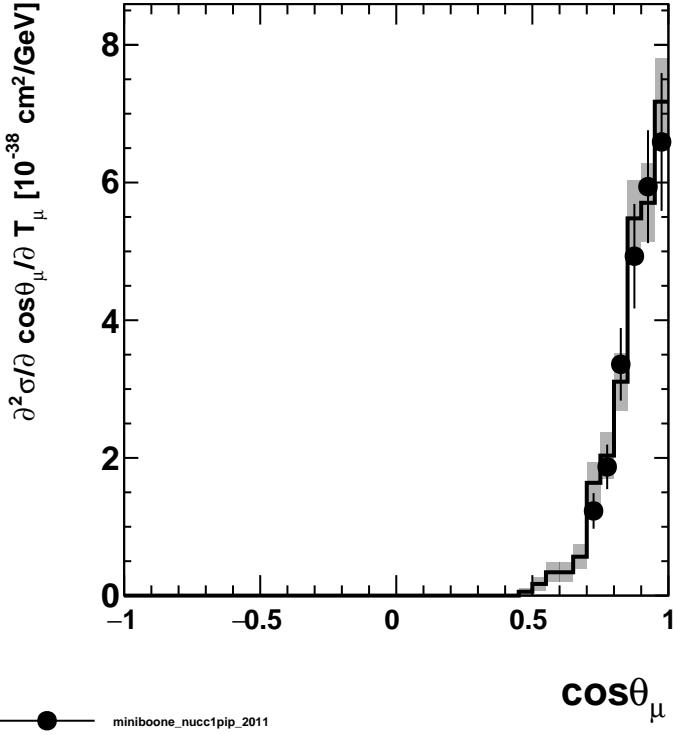
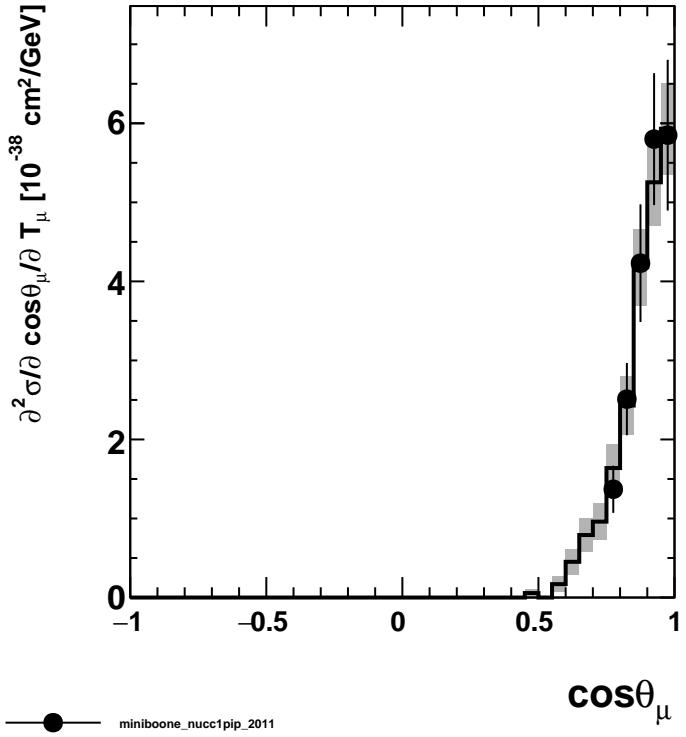
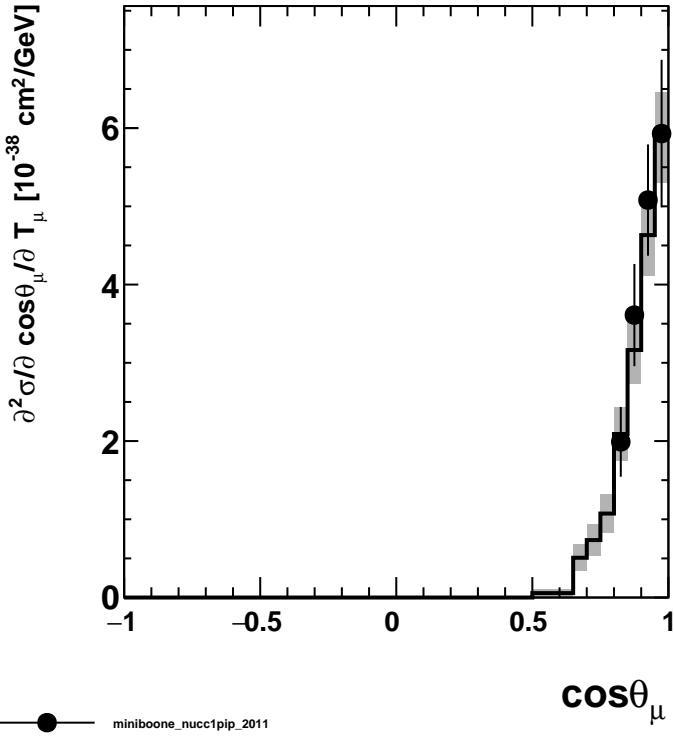


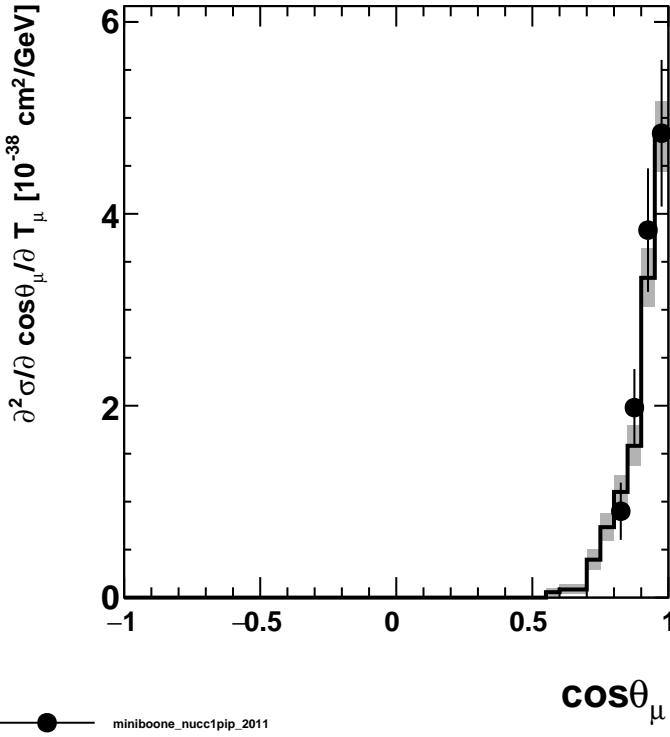
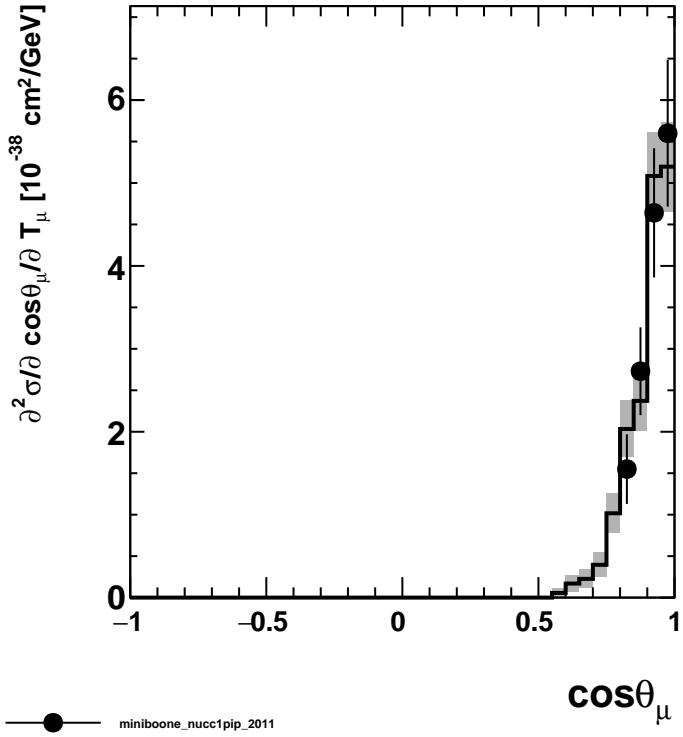
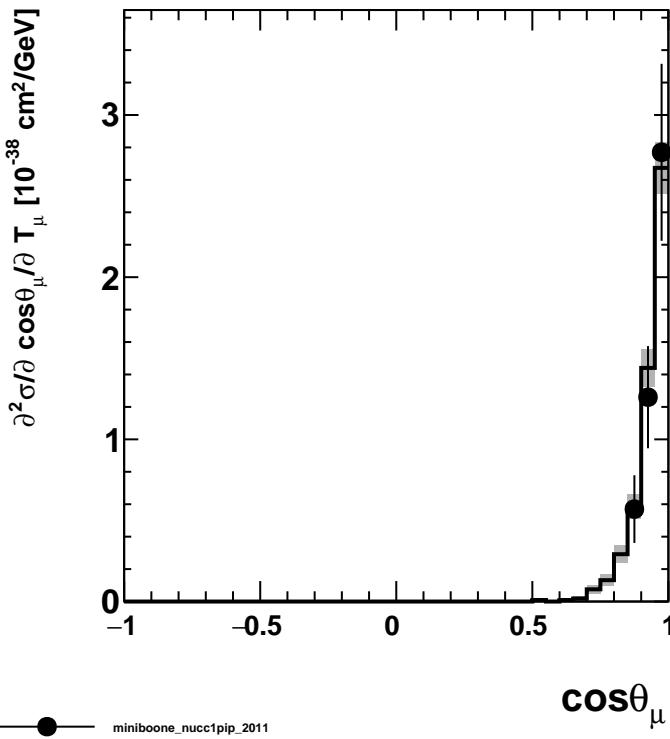
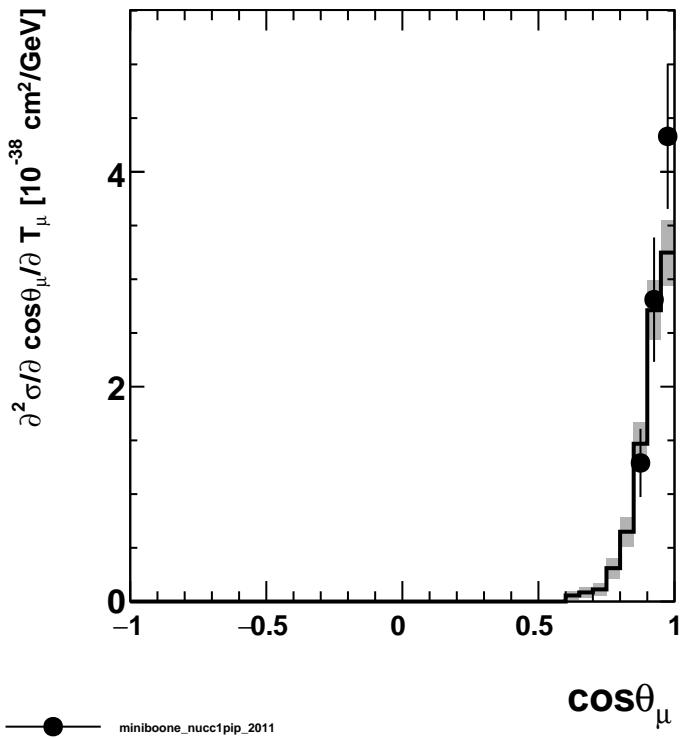


$T_\mu \in [0.15; 0.2] \text{ GeV}$  $T_\mu \in [0.2; 0.25] \text{ GeV}$  $T_\mu \in [0.25; 0.3] \text{ GeV}$  $T_\mu \in [0.3; 0.35] \text{ GeV}$ 

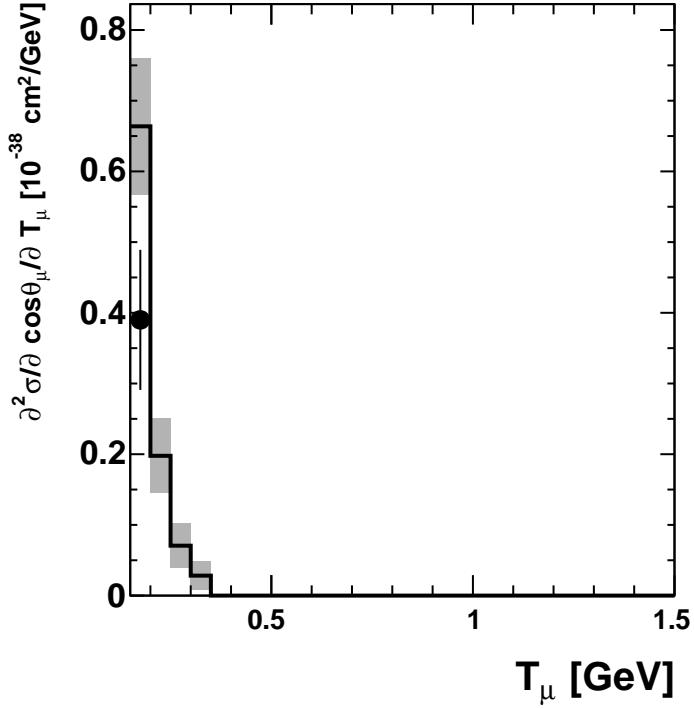
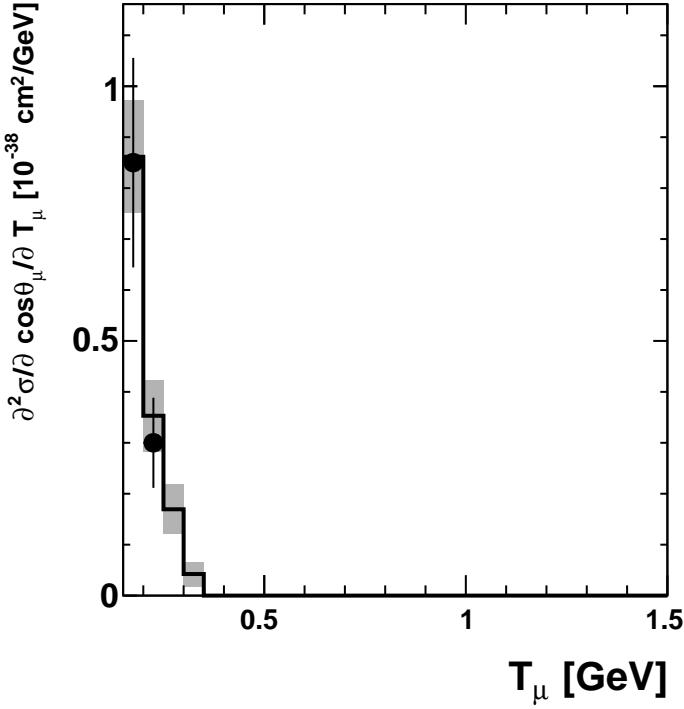
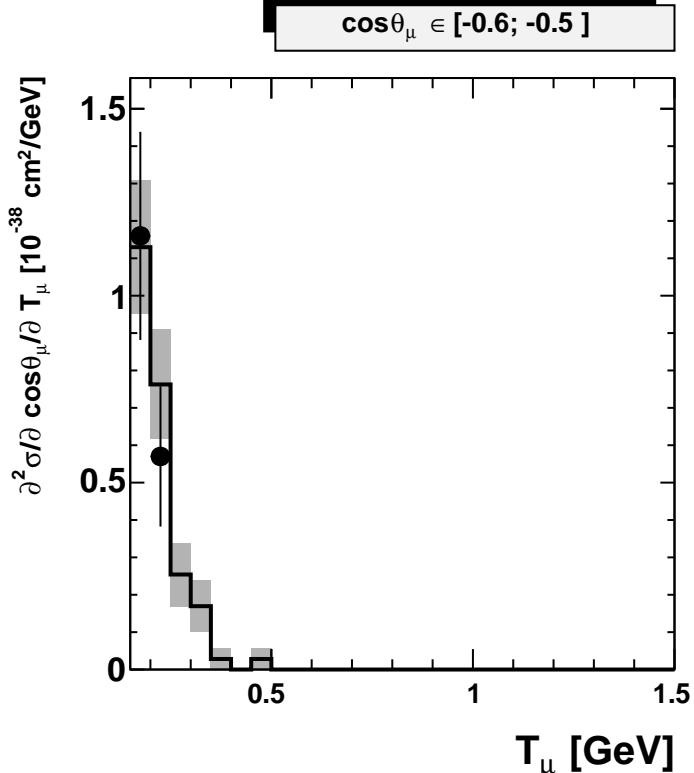
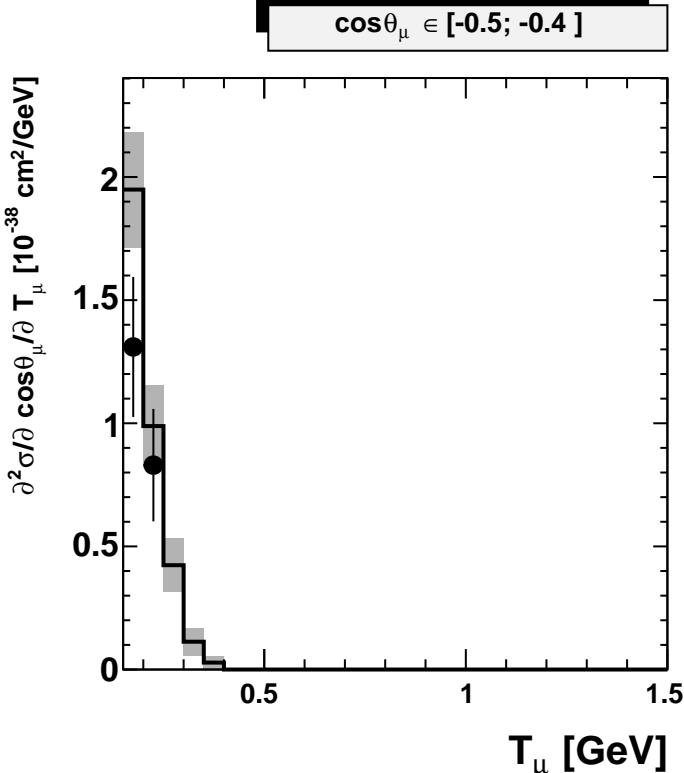


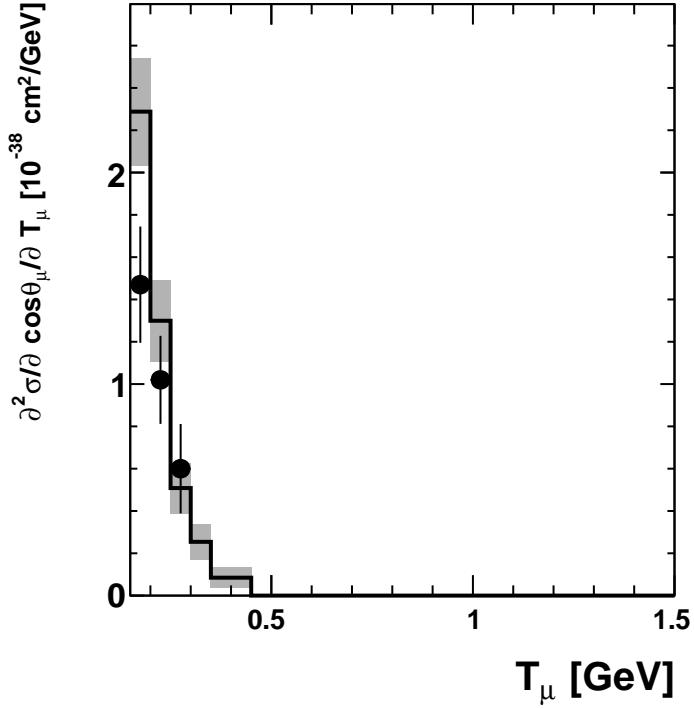
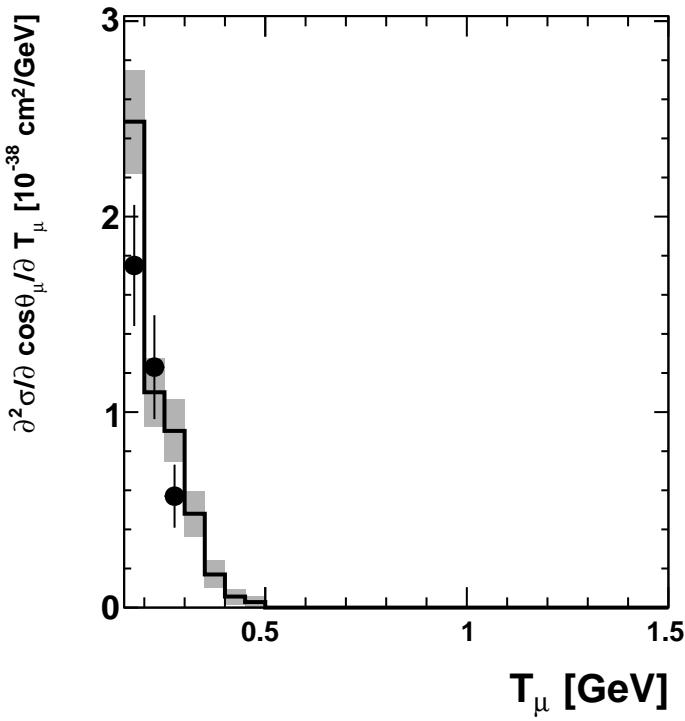
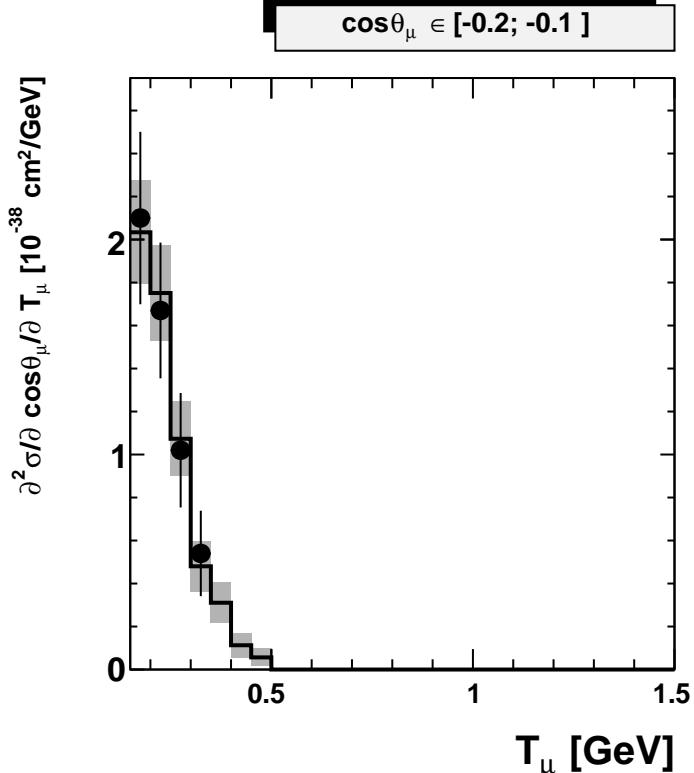
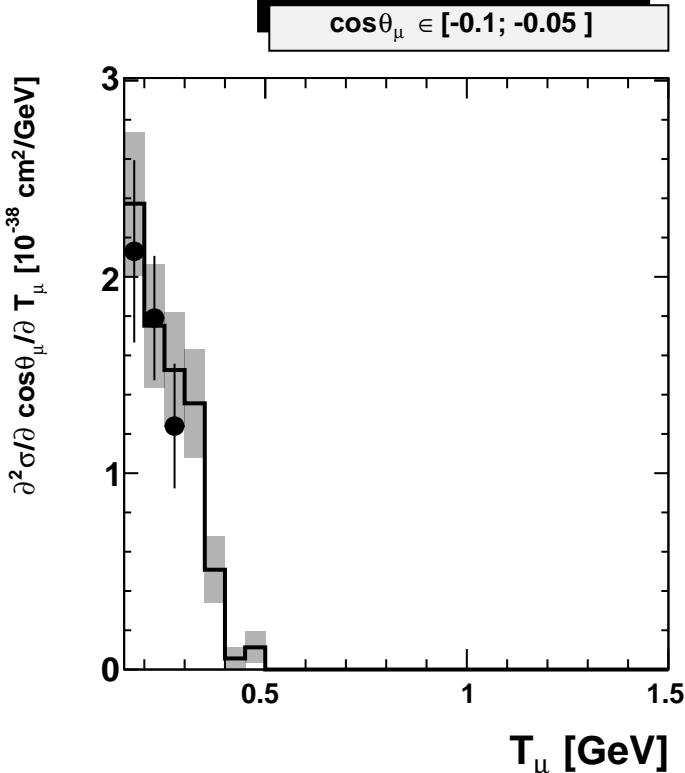
$T_\mu \in [0.55; 0.6] \text{ GeV}$  $T_\mu \in [0.6; 0.65] \text{ GeV}$  $T_\mu \in [0.65; 0.7] \text{ GeV}$  $T_\mu \in [0.7; 0.75] \text{ GeV}$ 

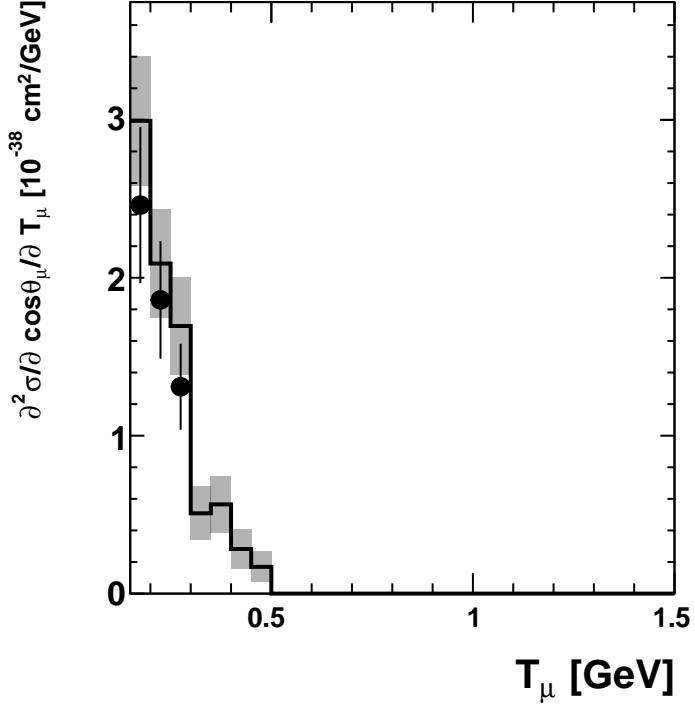
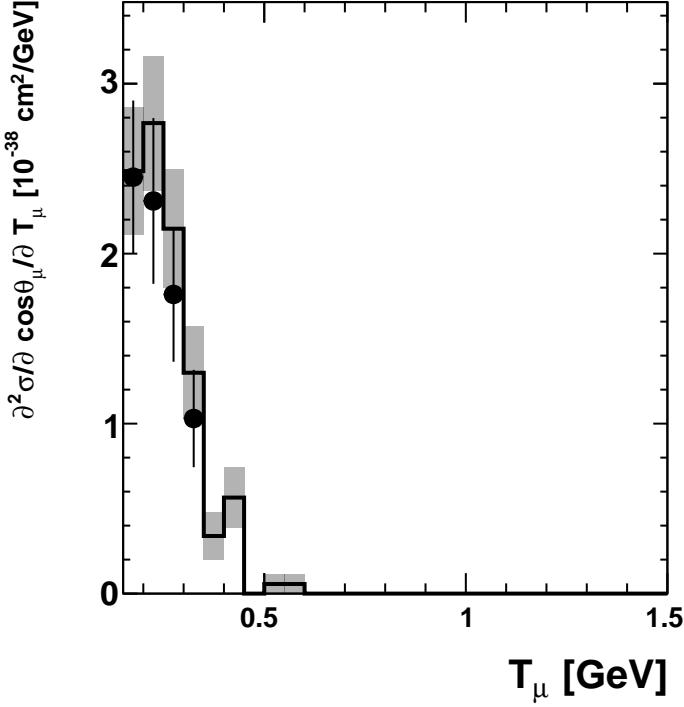
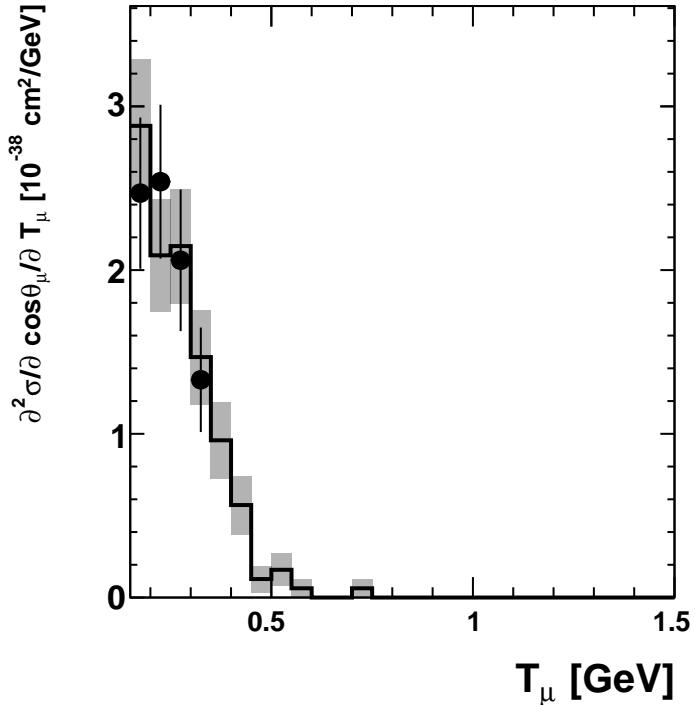
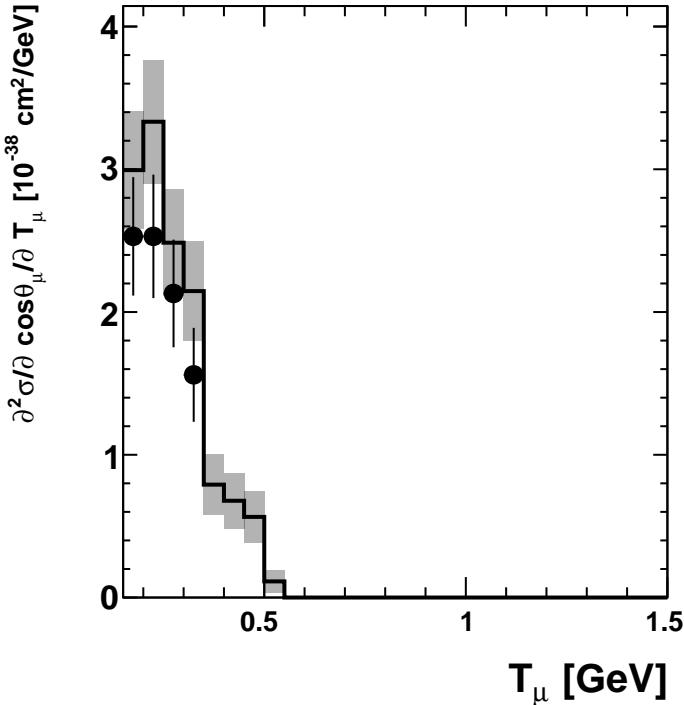
$T_\mu \in [0.75; 0.8] \text{ GeV}$  $T_\mu \in [0.8; 0.85] \text{ GeV}$  $T_\mu \in [0.85; 0.9] \text{ GeV}$  $T_\mu \in [0.9; 0.95] \text{ GeV}$ 

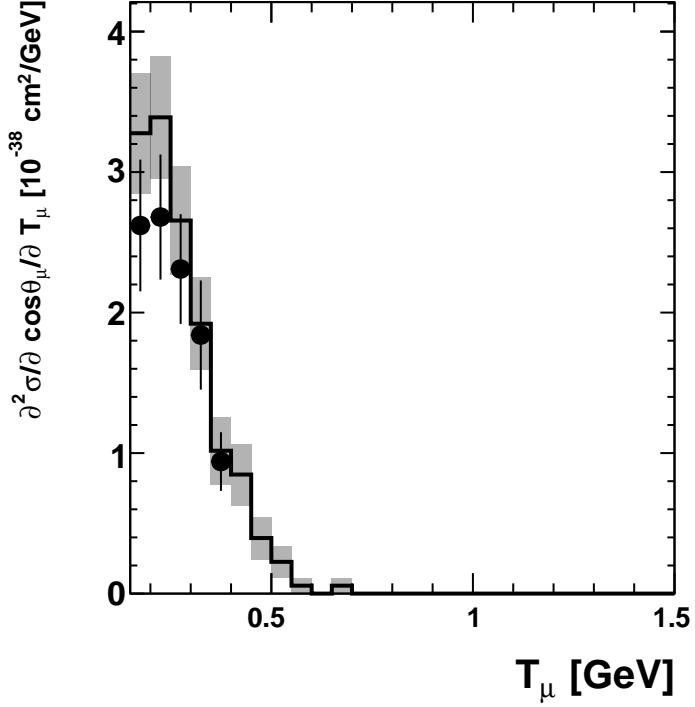
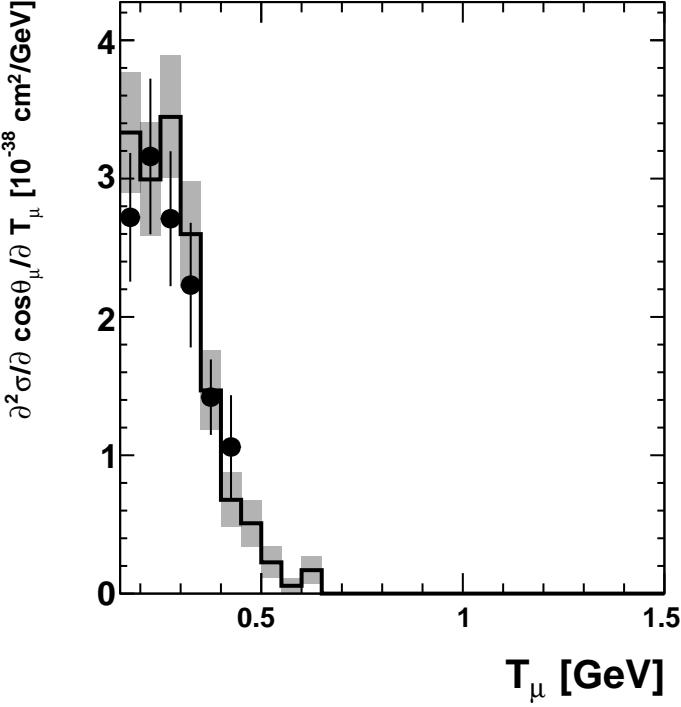
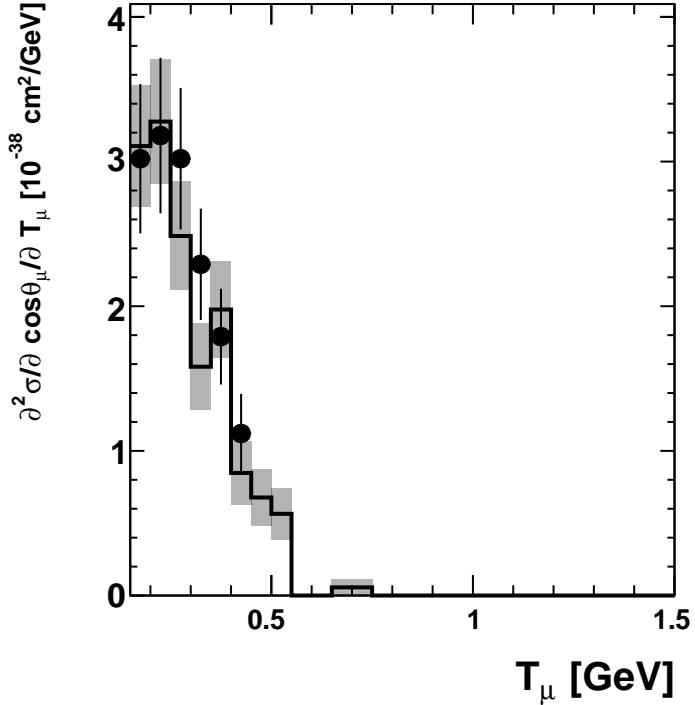
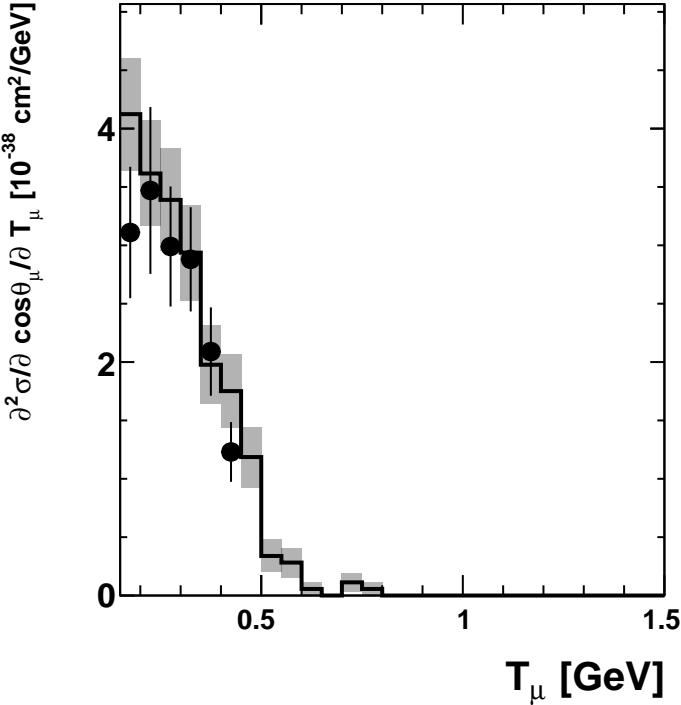
$T_\mu \in [0.95; 1] \text{ GeV}$  $T_\mu \in [1; 1.1] \text{ GeV}$  $T_\mu \in [1.1; 1.2] \text{ GeV}$  $T_\mu \in [1.2; 1.5] \text{ GeV}$ 

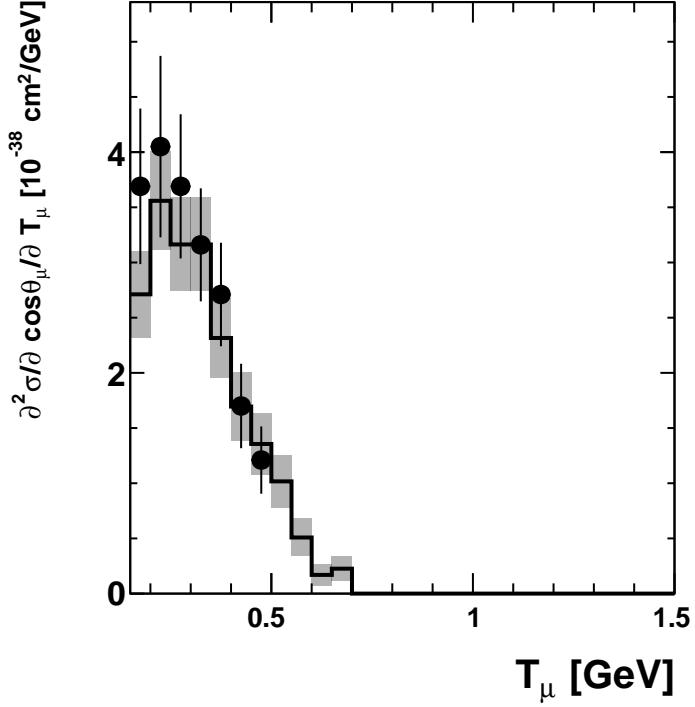
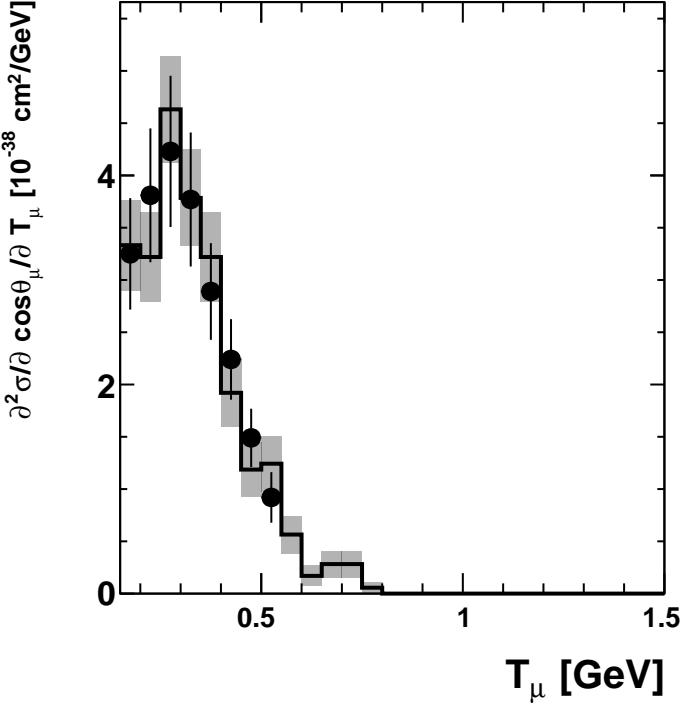
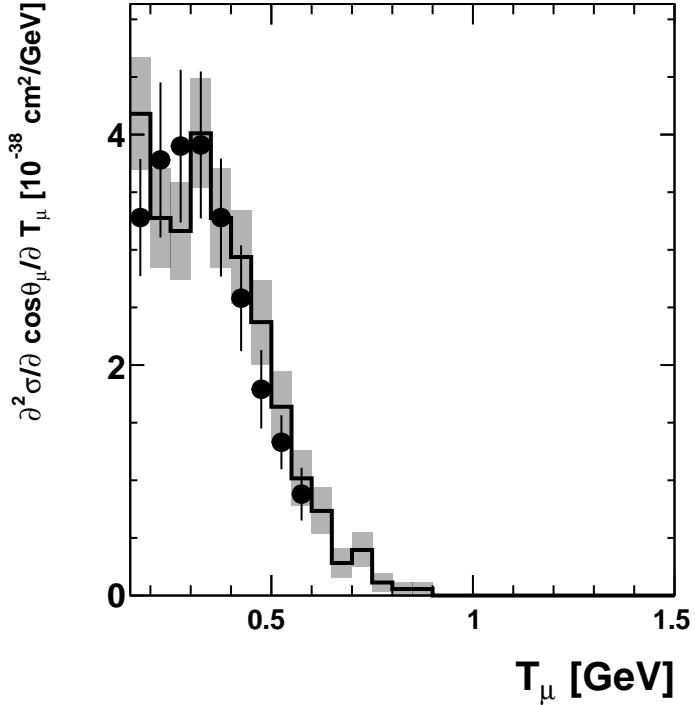
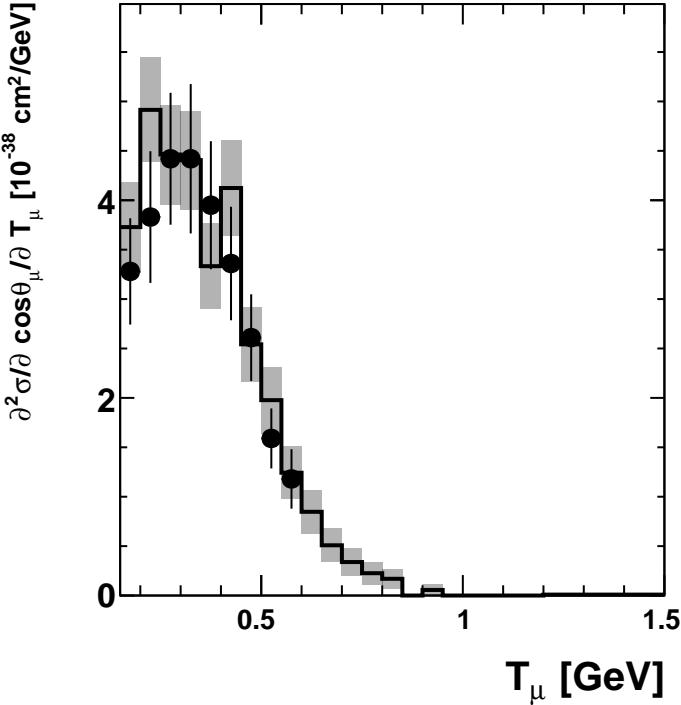


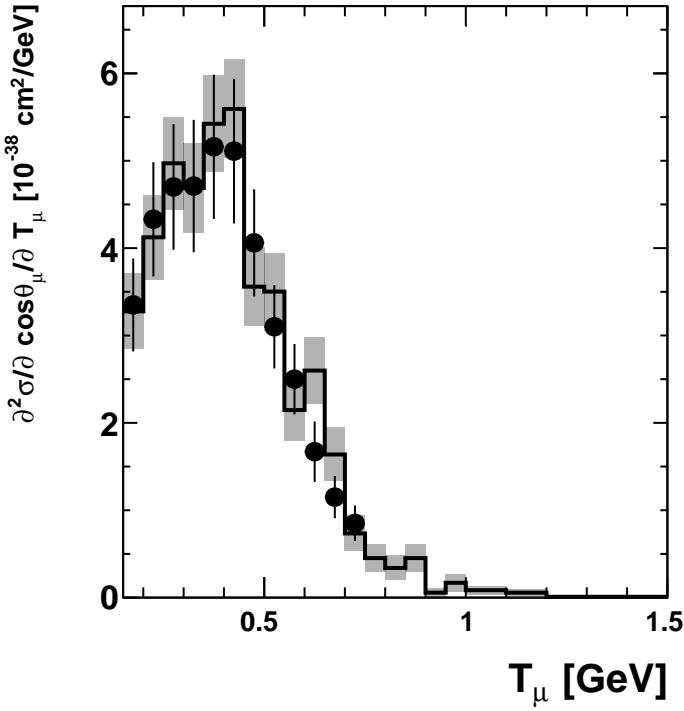
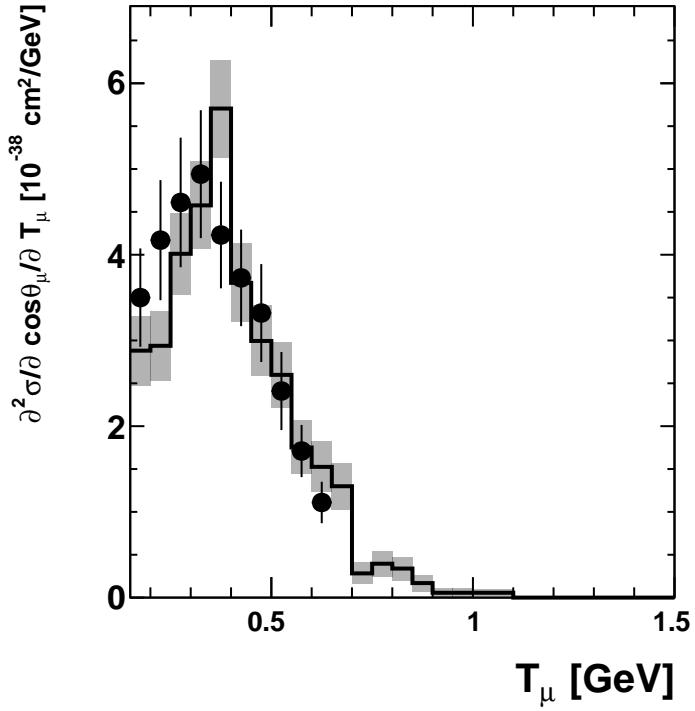
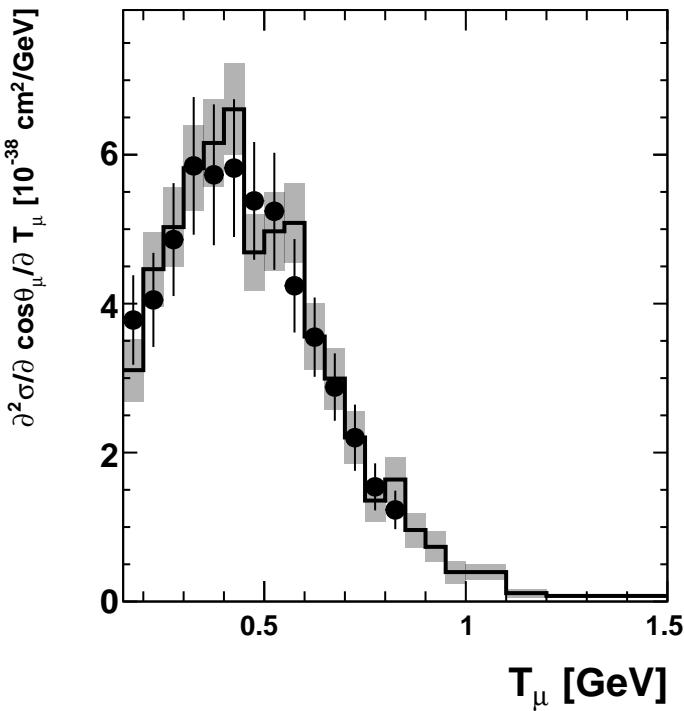
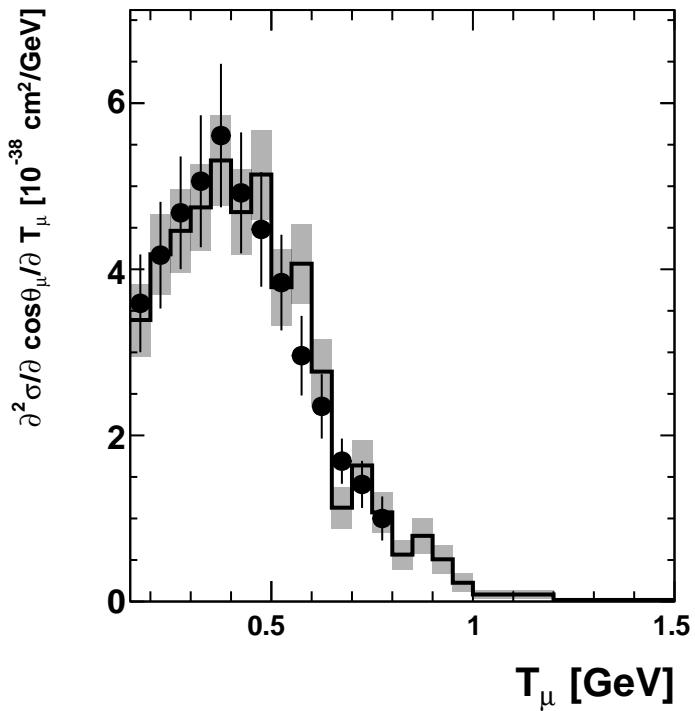
$\cos\theta_\mu \in [-1; -0.8]$  $\cos\theta_\mu \in [-0.8; -0.6]$  $\cos\theta_\mu \in [-0.6; -0.5]$  $\cos\theta_\mu \in [-0.5; -0.4]$ 

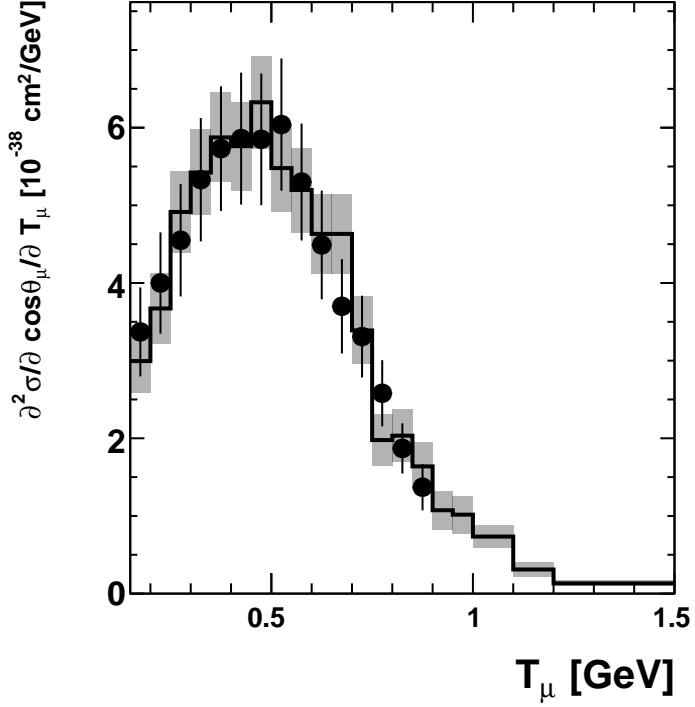
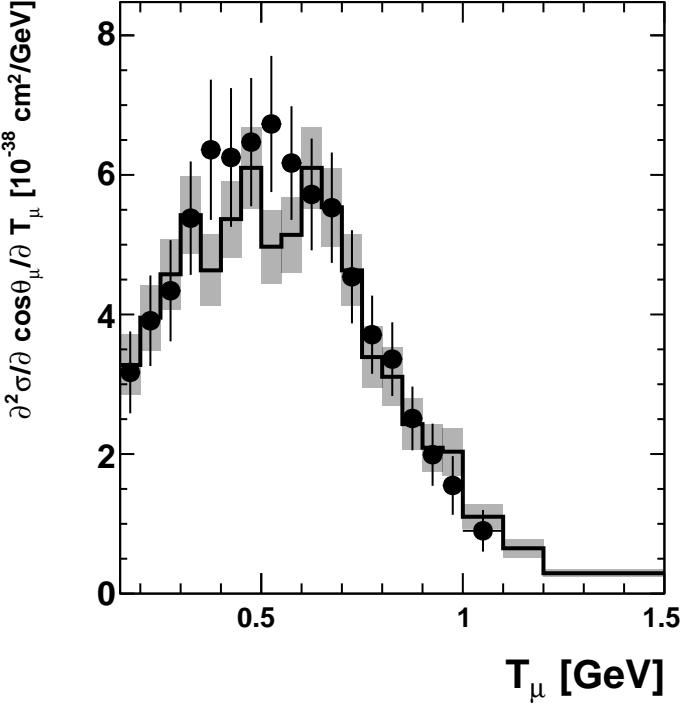
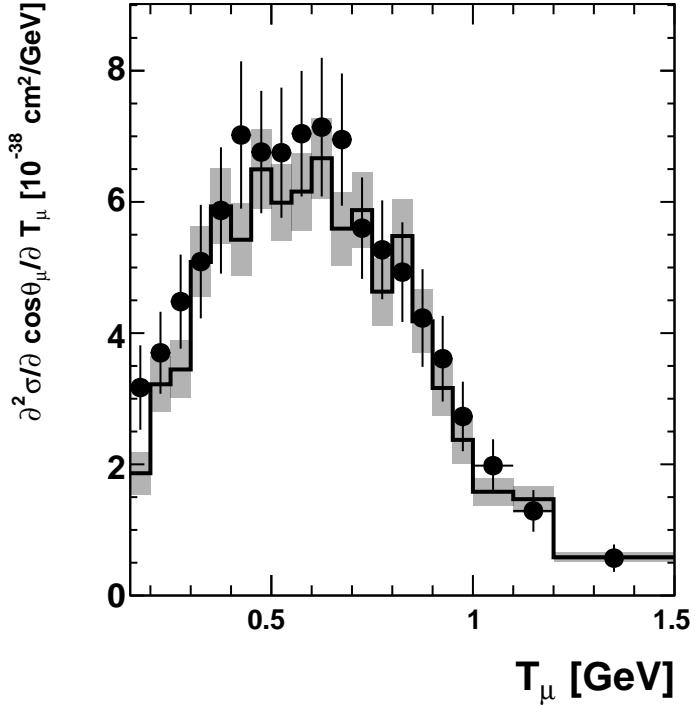
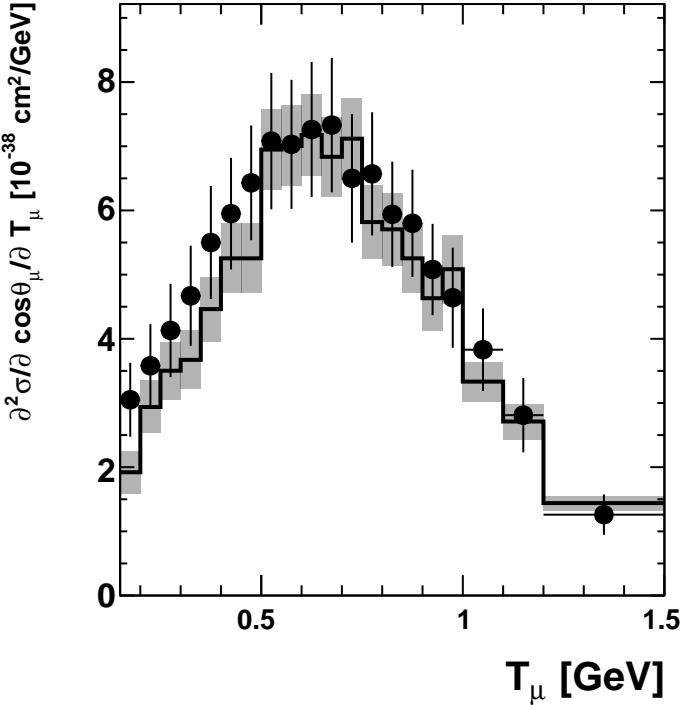
$\cos\theta_\mu \in [-0.4; -0.3]$  $\cos\theta_\mu \in [-0.3; -0.2]$  $\cos\theta_\mu \in [-0.2; -0.1]$  $\cos\theta_\mu \in [-0.1; -0.05]$ 

$\cos\theta_\mu \in [-0.05; 0]$  $\cos\theta_\mu \in [0; 0.05]$  $\cos\theta_\mu \in [0.05; 0.1]$  $\cos\theta_\mu \in [0.1; 0.15]$ 

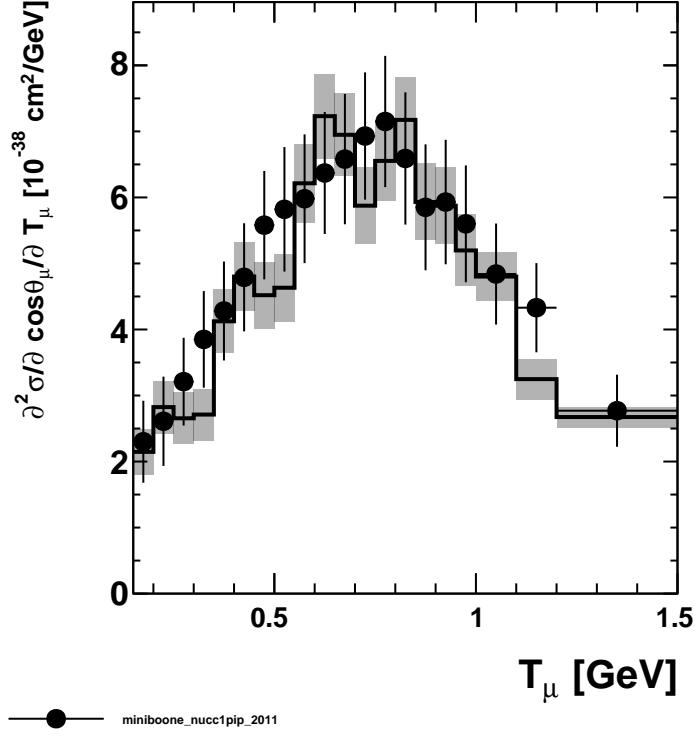
$\cos\theta_\mu \in [0.15; 0.2 ]$  $\cos\theta_\mu \in [0.2; 0.25 ]$  $\cos\theta_\mu \in [0.25; 0.3 ]$  $\cos\theta_\mu \in [0.3; 0.35 ]$ 

$\cos\theta_\mu \in [0.35; 0.4 ]$  $\cos\theta_\mu \in [0.4; 0.45 ]$  $\cos\theta_\mu \in [0.45; 0.5 ]$  $\cos\theta_\mu \in [0.5; 0.55 ]$ 

$\cos\theta_\mu \in [0.55; 0.6]$  $\cos\theta_\mu \in [0.6; 0.65]$  $\cos\theta_\mu \in [0.65; 0.7]$  $\cos\theta_\mu \in [0.7; 0.75]$ 

$\cos\theta_\mu \in [0.75; 0.8]$  $\cos\theta_\mu \in [0.8; 0.85]$  $\cos\theta_\mu \in [0.85; 0.9]$  $\cos\theta_\mu \in [0.9; 0.95]$ 

$\cos\theta_\mu \in [0.95; 1]$

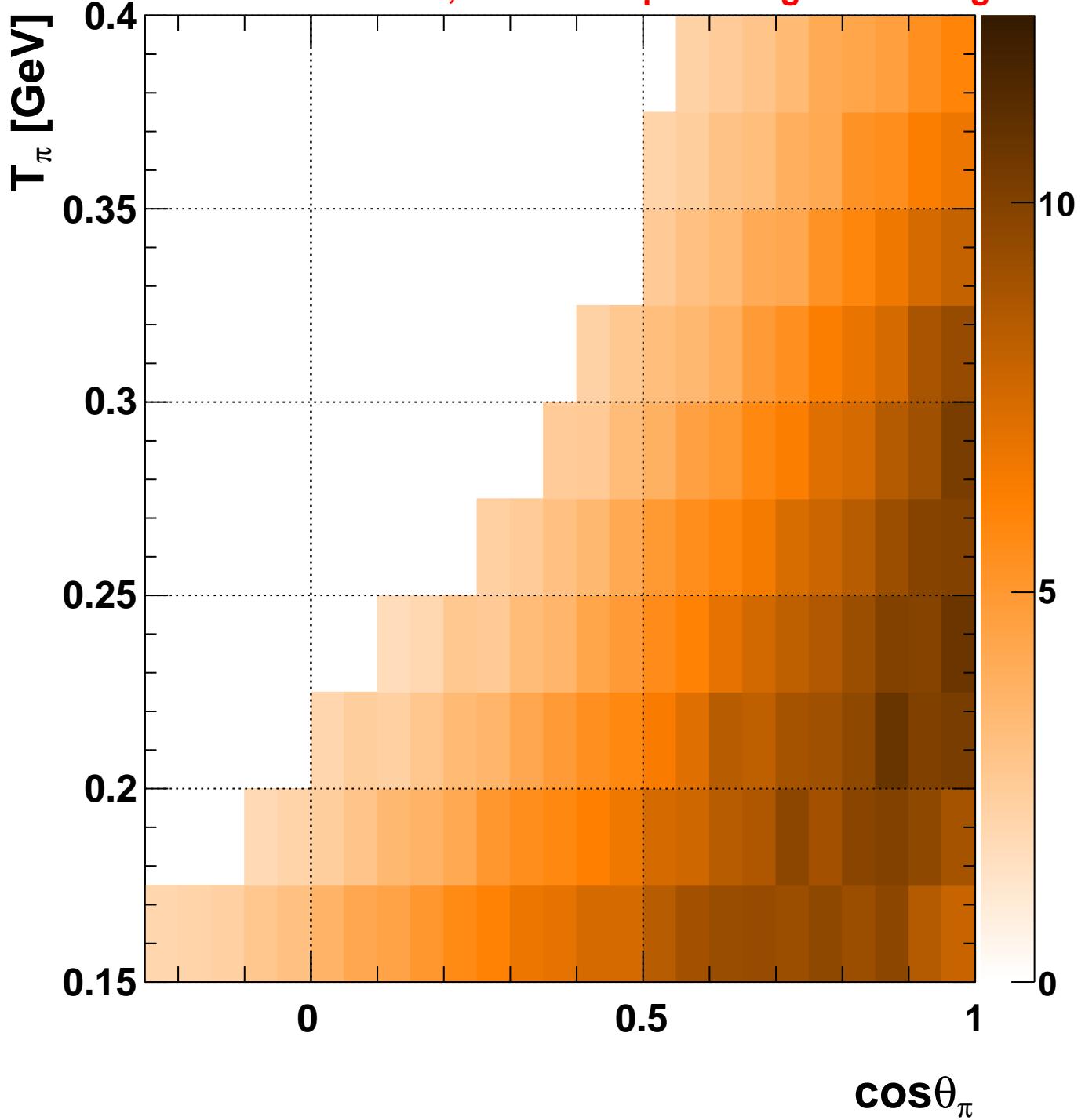


● miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.44/20$  DoF



© 2003-2018, GENIE - <http://www.genie-mc.org>

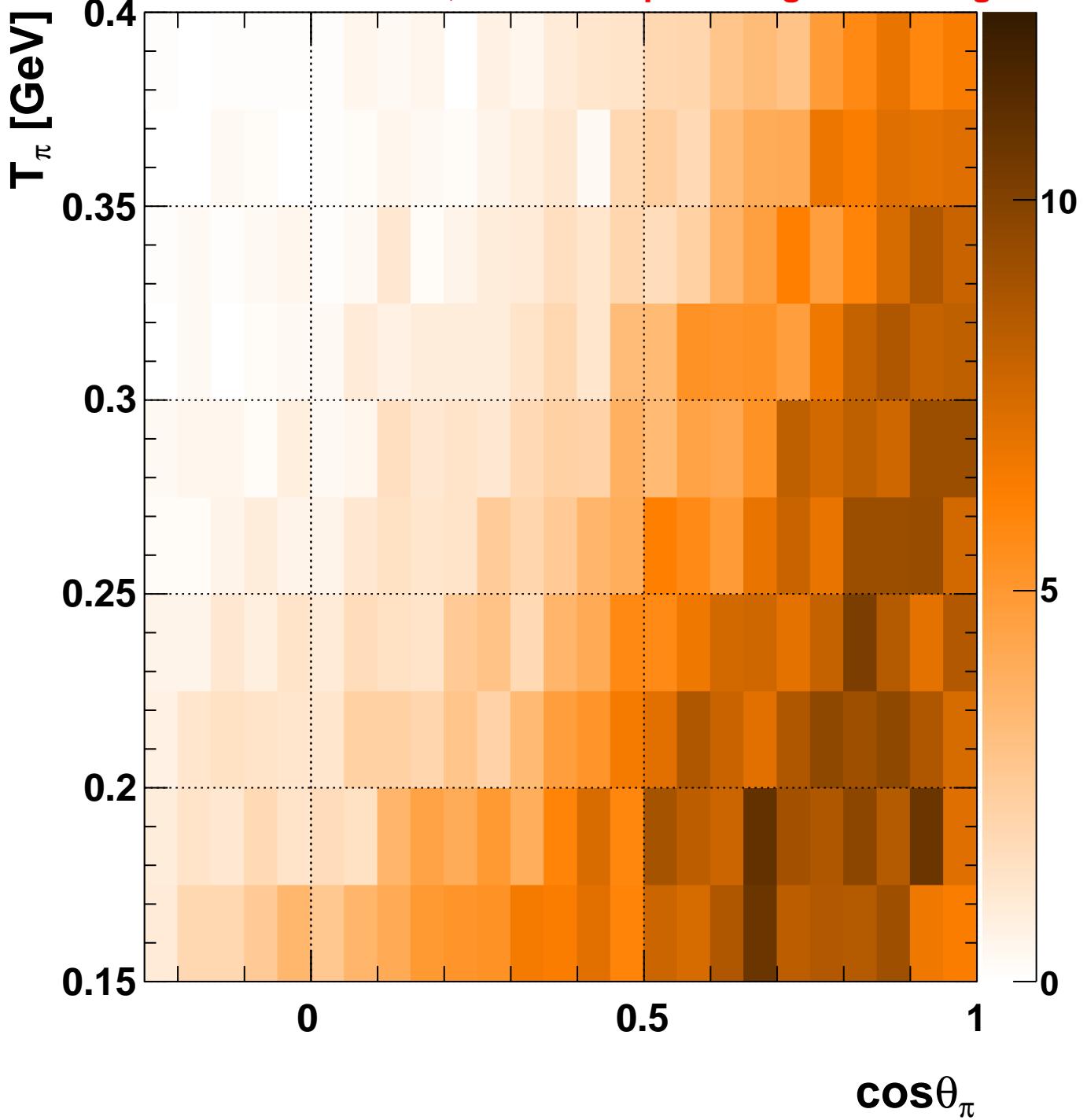


$\cos\theta_\pi$

$\partial^2\sigma/\partial \cos\theta_\pi/\partial T_\pi$  [ $10^{-38} \text{ cm}^2/\text{GeV}$ ]

Data: miniboone\_nucc1pip\_2011

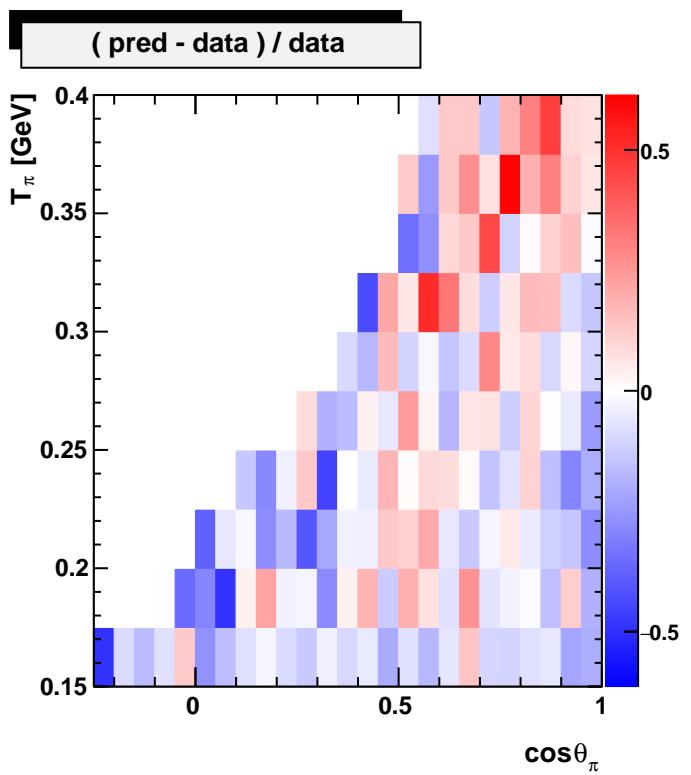
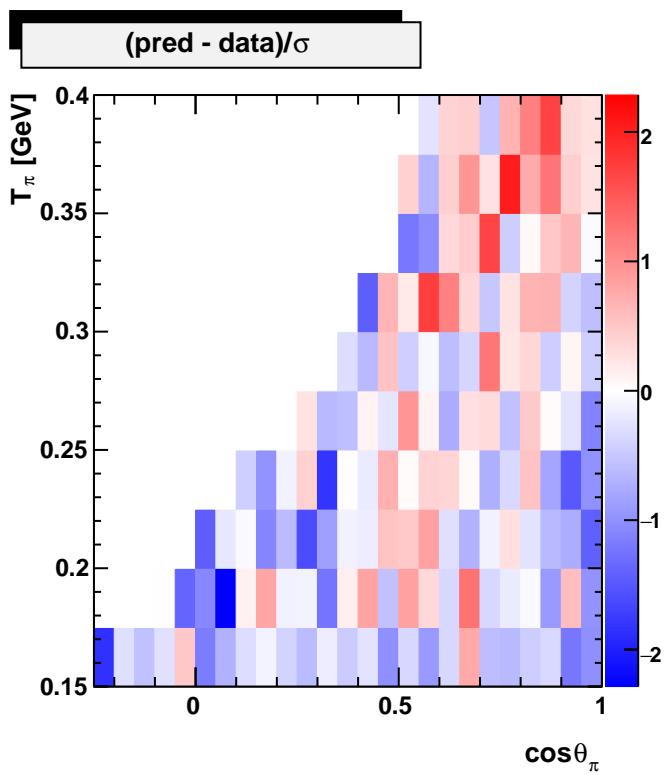
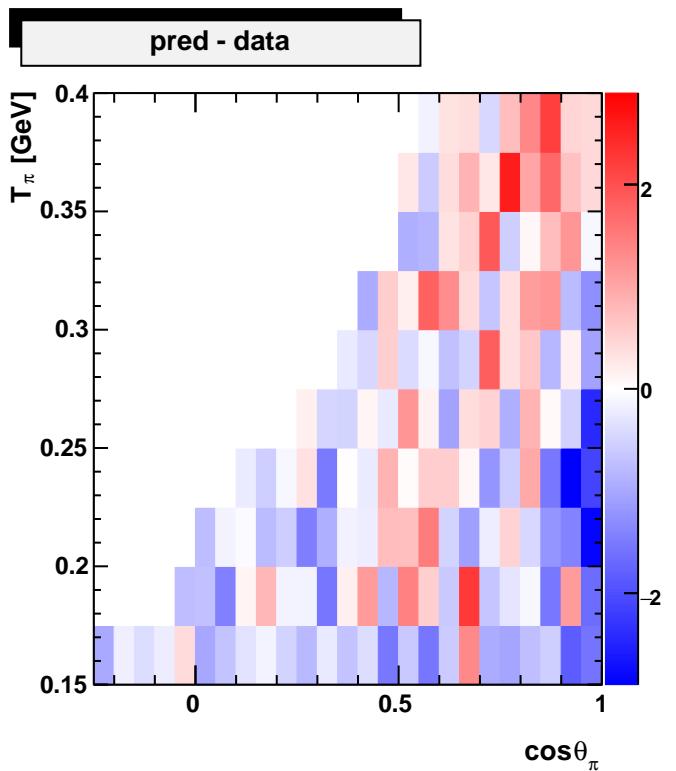
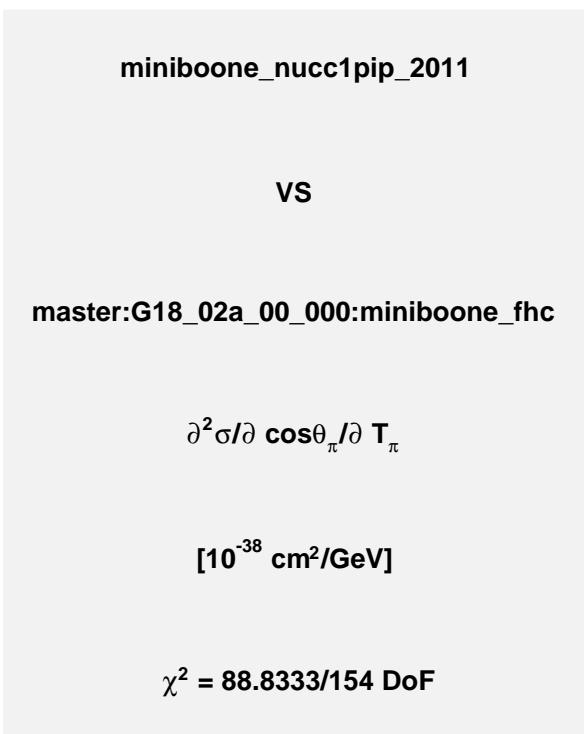
© 2003-2018, GENIE - <http://www.genie-mc.org>



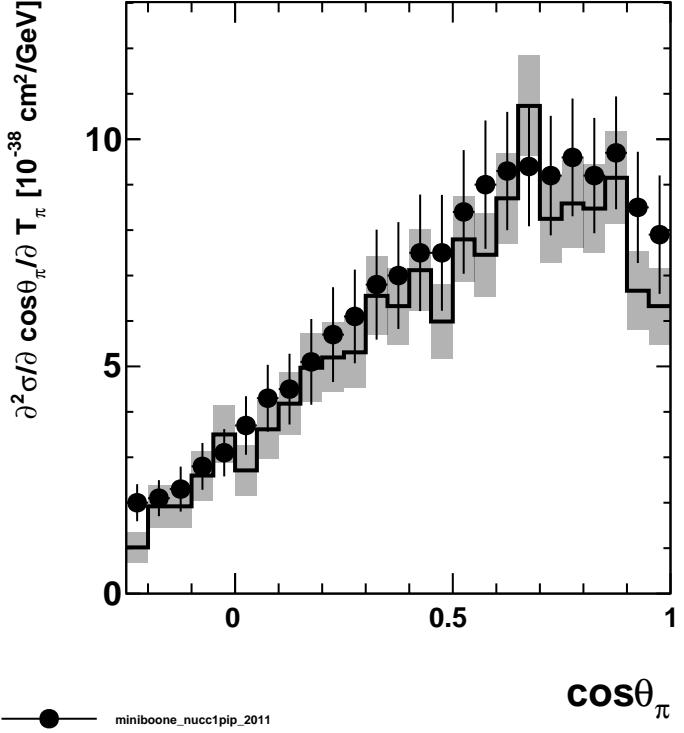
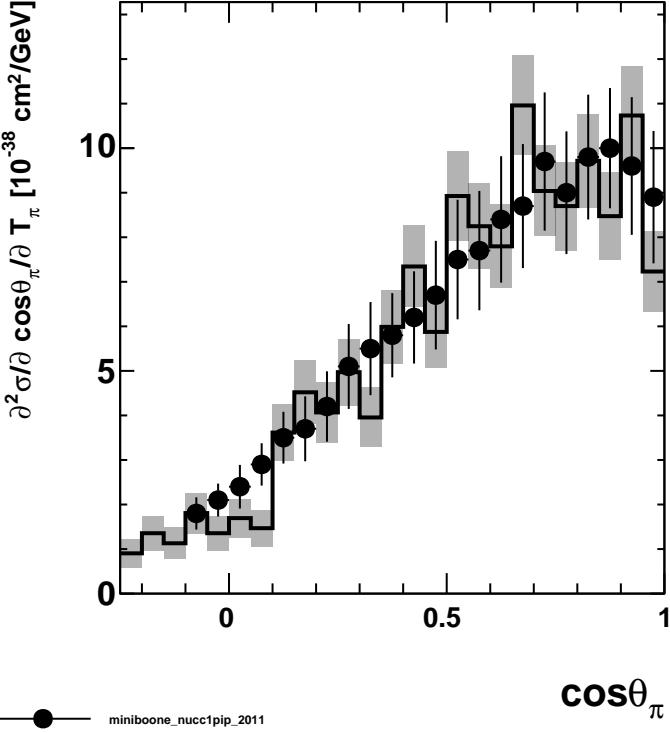
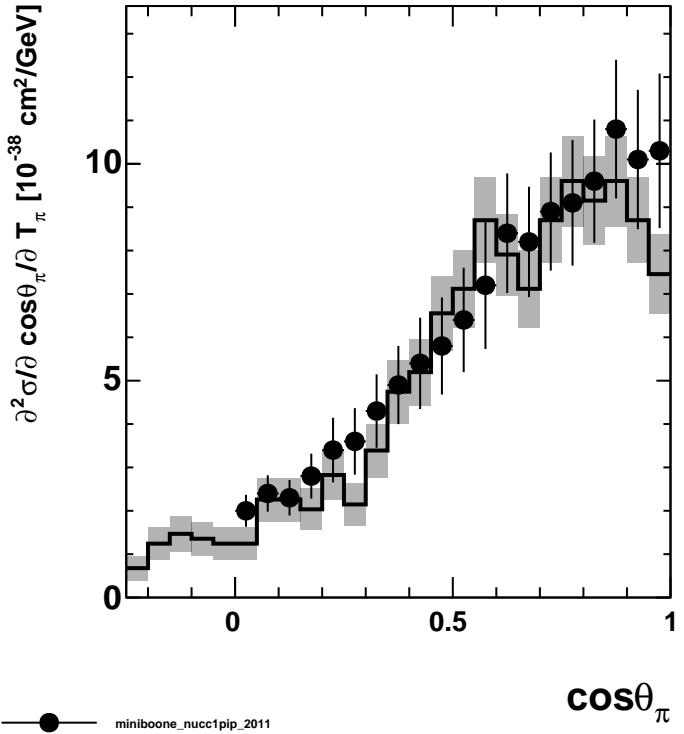
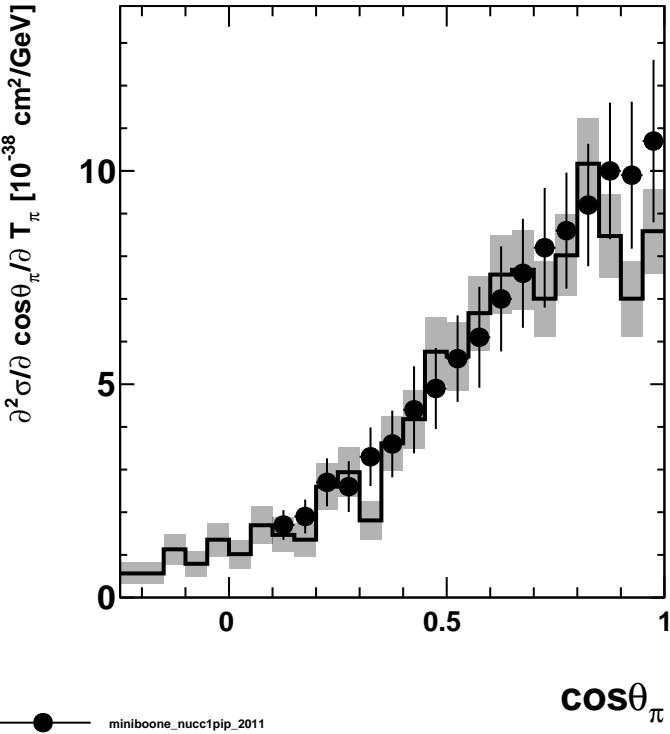
$$\partial^2\sigma/\partial \cos\theta_\pi/\partial T_\pi [10^{-38} \text{ cm}^2/\text{GeV}]$$

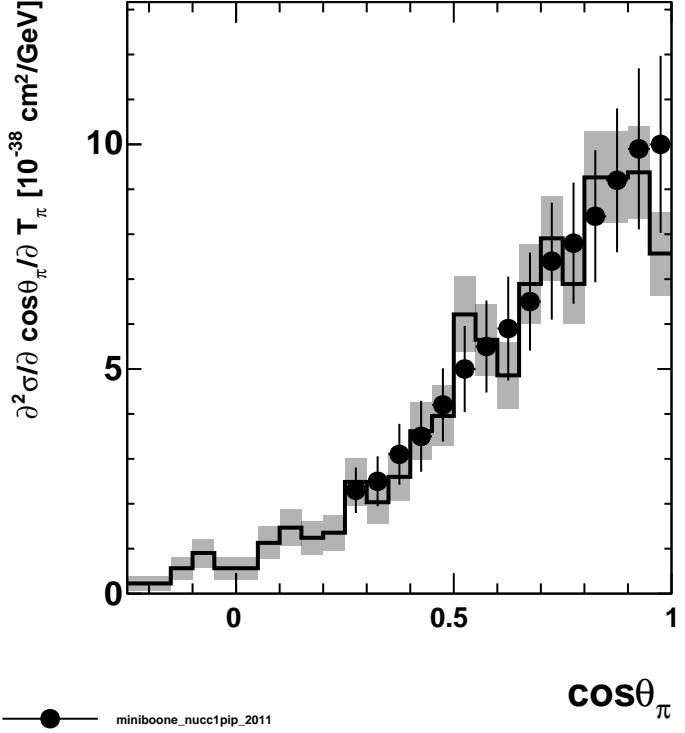
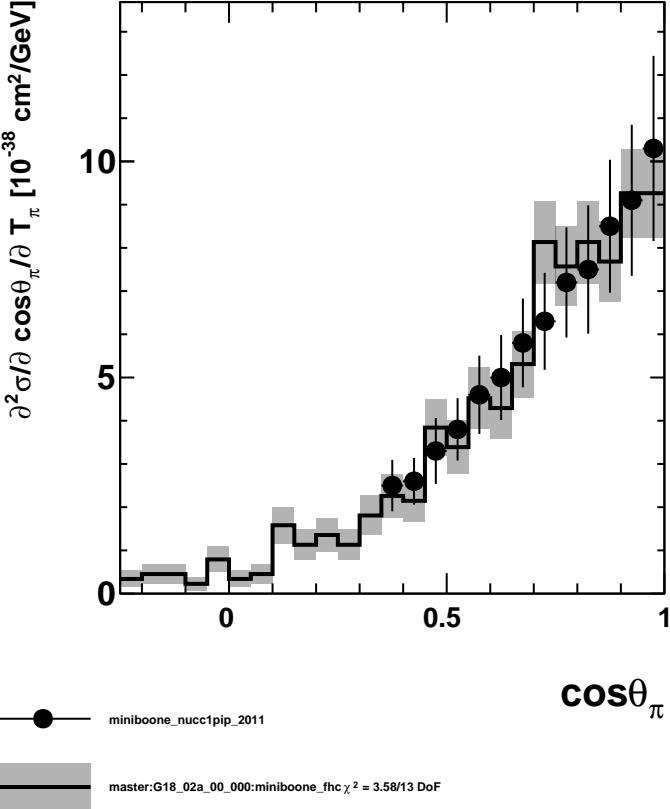
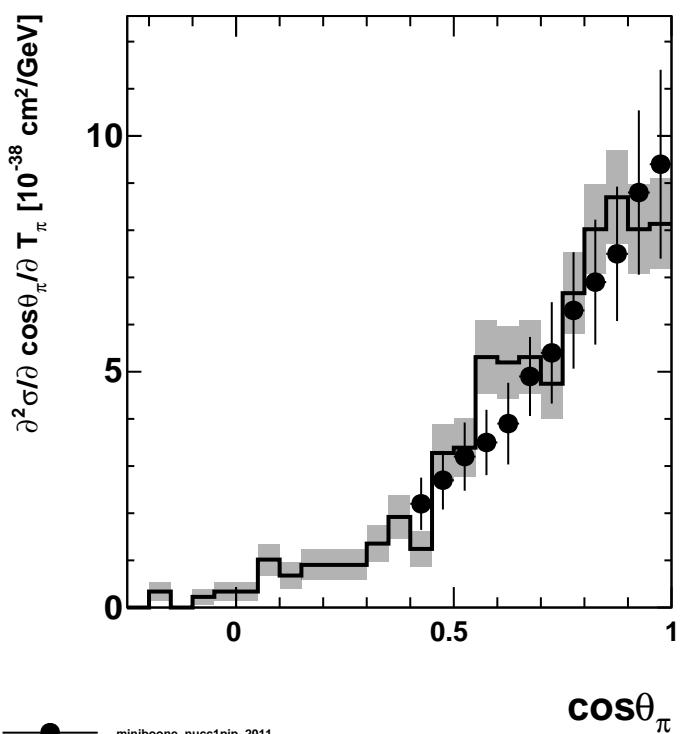
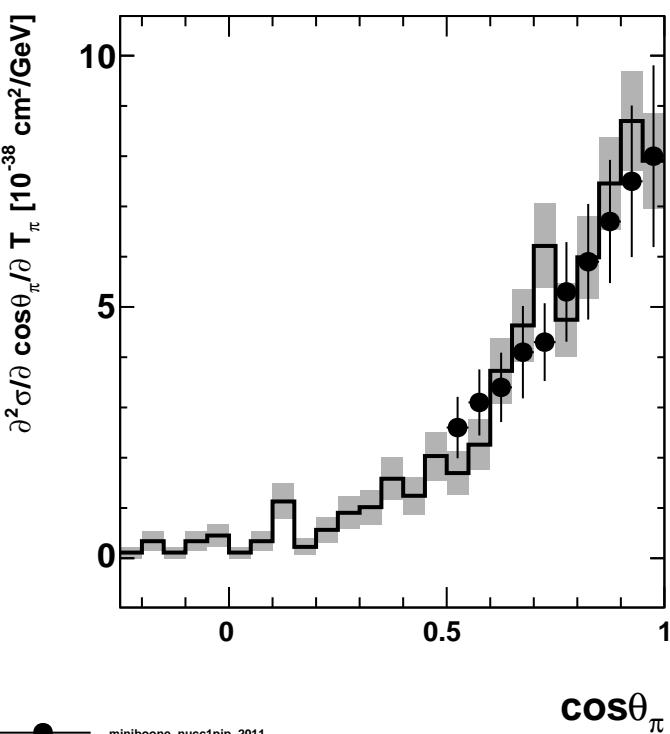
$\cos\theta_\pi$

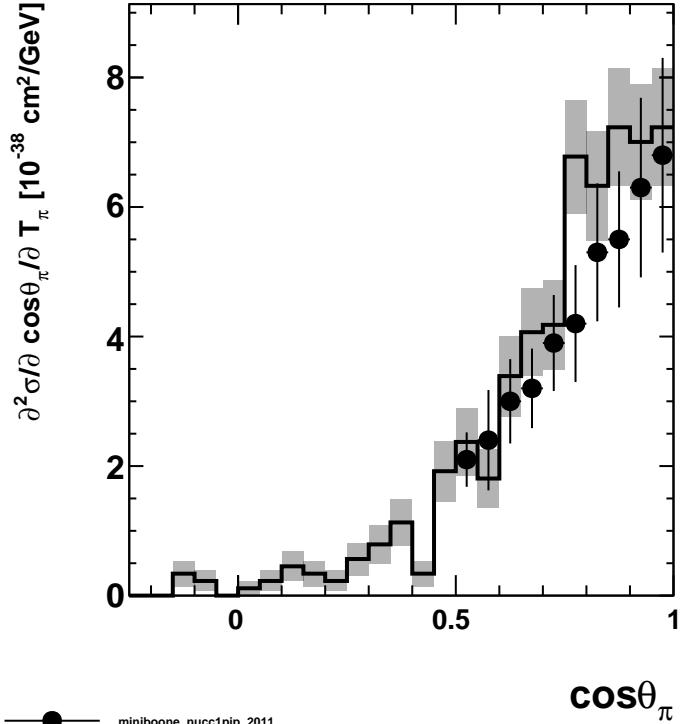
Pred: master:G18\_02a\_00\_000:miniboone\_fhc



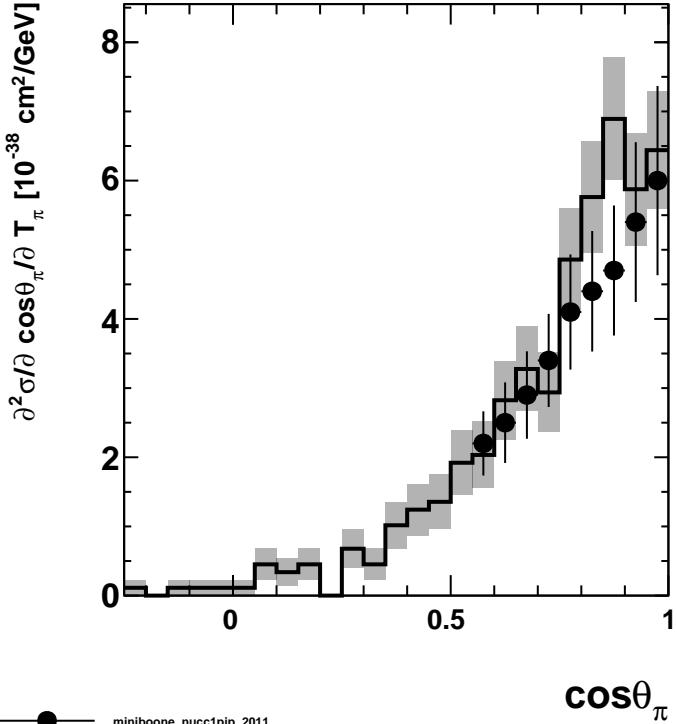


$T_\pi \in [0.15; 0.175] \text{ GeV}$  $T_\pi \in [0.175; 0.2] \text{ GeV}$  $T_\pi \in [0.2; 0.225] \text{ GeV}$  $T_\pi \in [0.225; 0.25] \text{ GeV}$ 

$T_\pi \in [0.25; 0.275] \text{ GeV}$  $T_\pi \in [0.275; 0.3] \text{ GeV}$  $T_\pi \in [0.3; 0.325] \text{ GeV}$  $T_\pi \in [0.325; 0.35] \text{ GeV}$ 

$T_\pi \in [0.35; 0.375] \text{ GeV}$ 

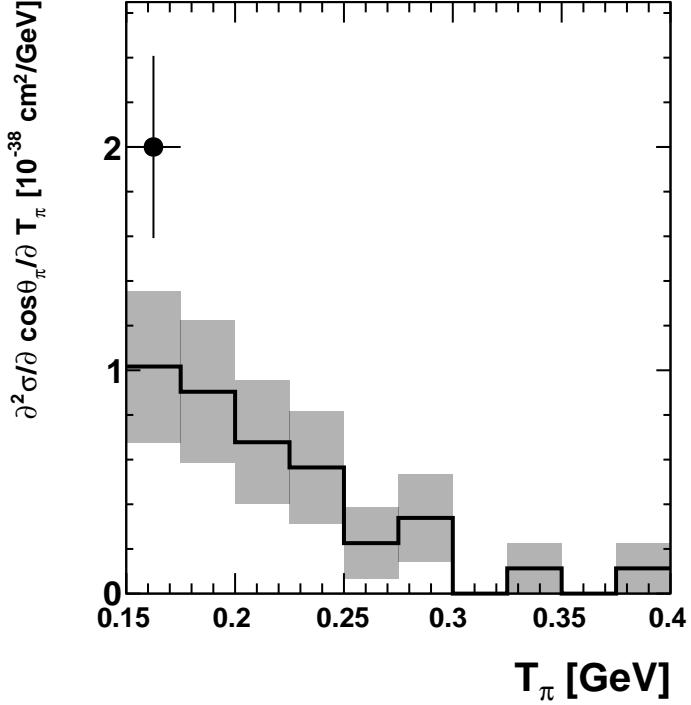
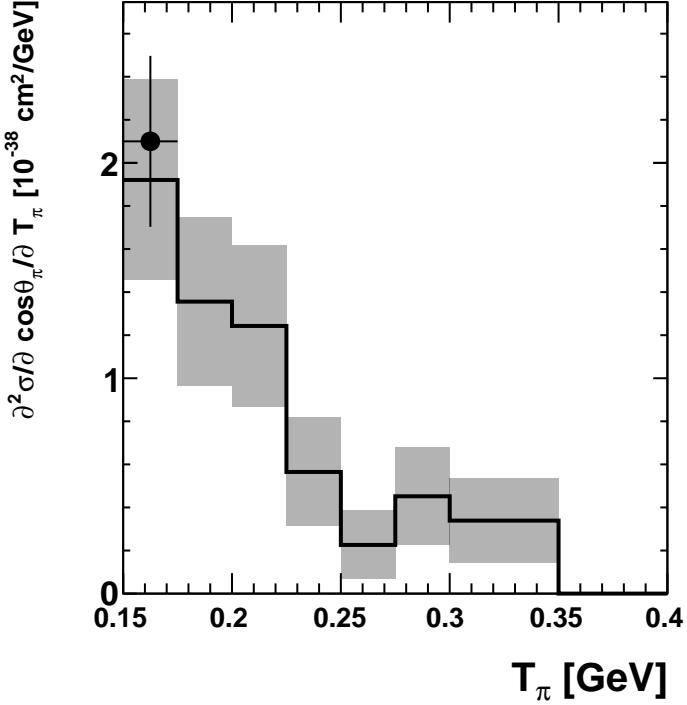
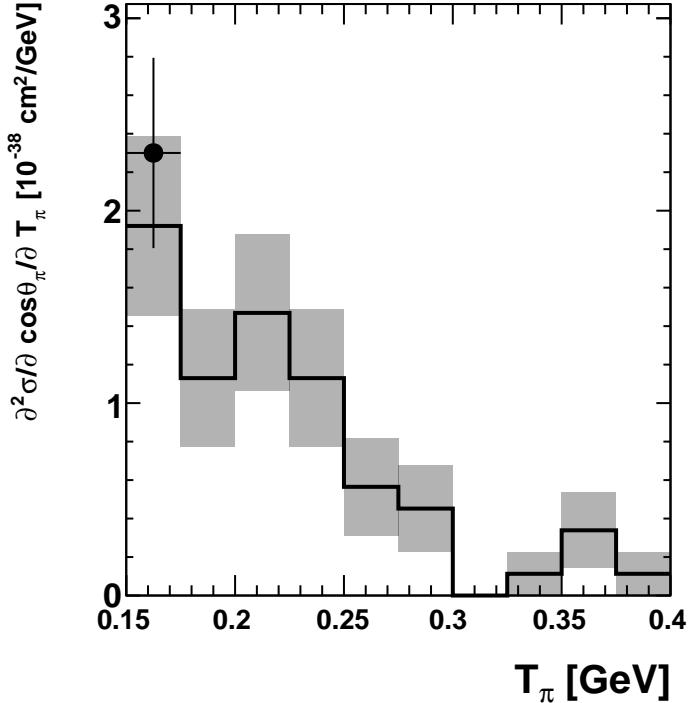
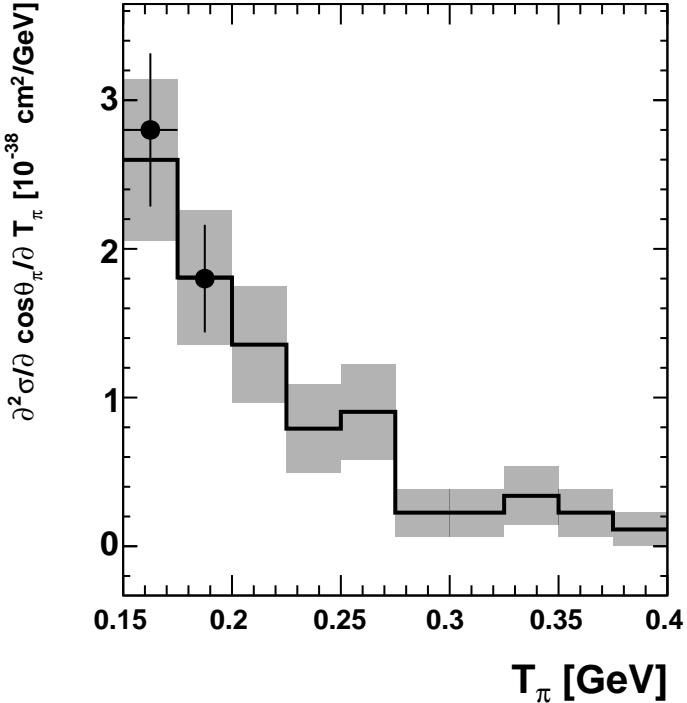
miniboone\_nucc1pip\_2011

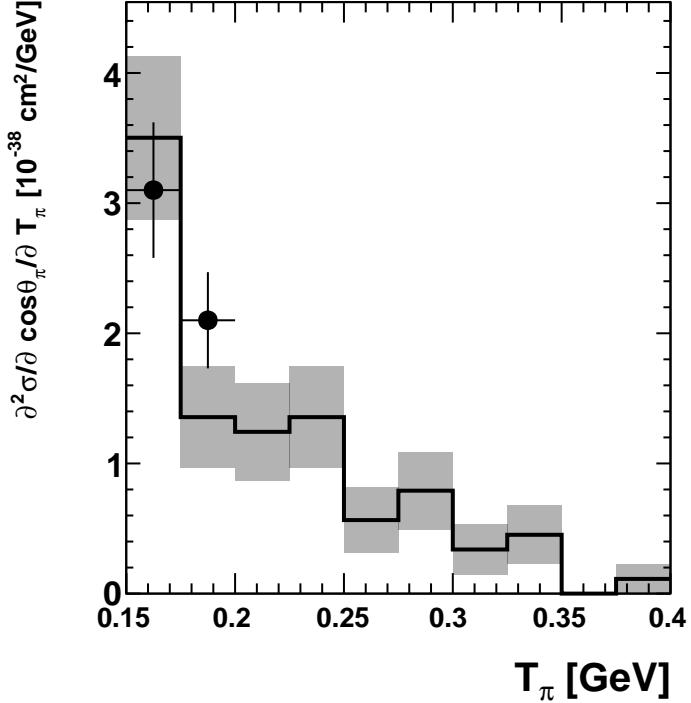
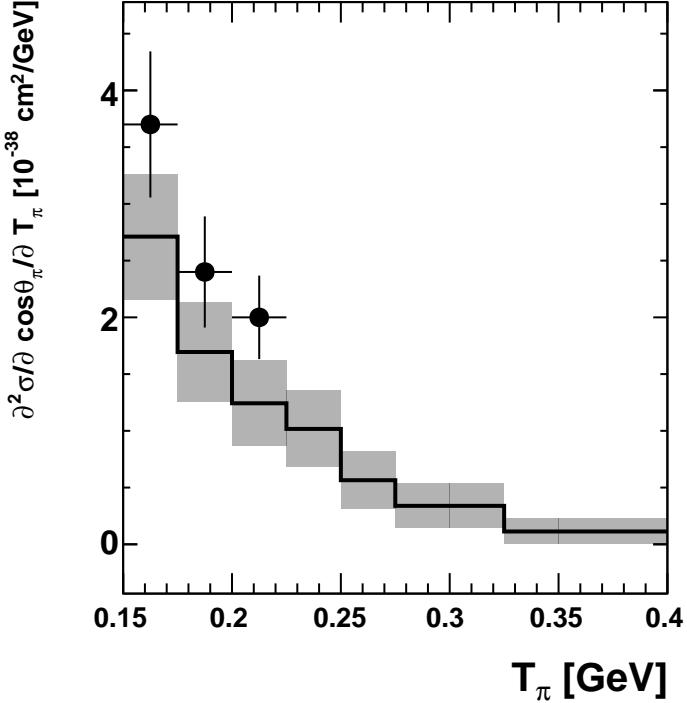
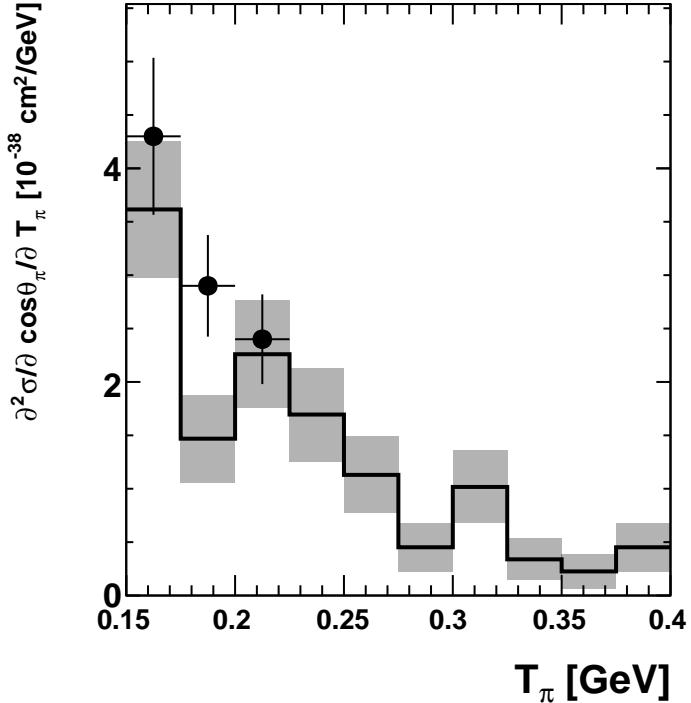
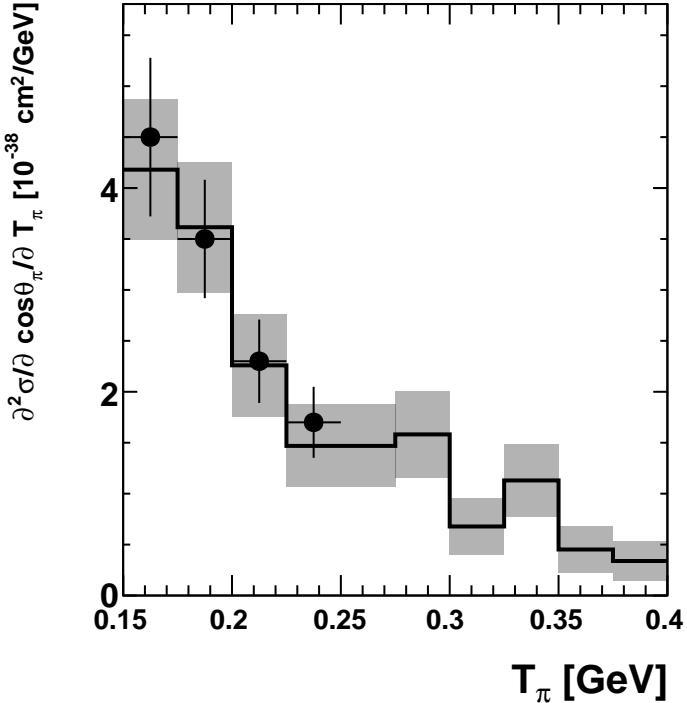
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 8.35/10 \text{ DoF}$  $T_\pi \in [0.375; 0.4] \text{ GeV}$ 

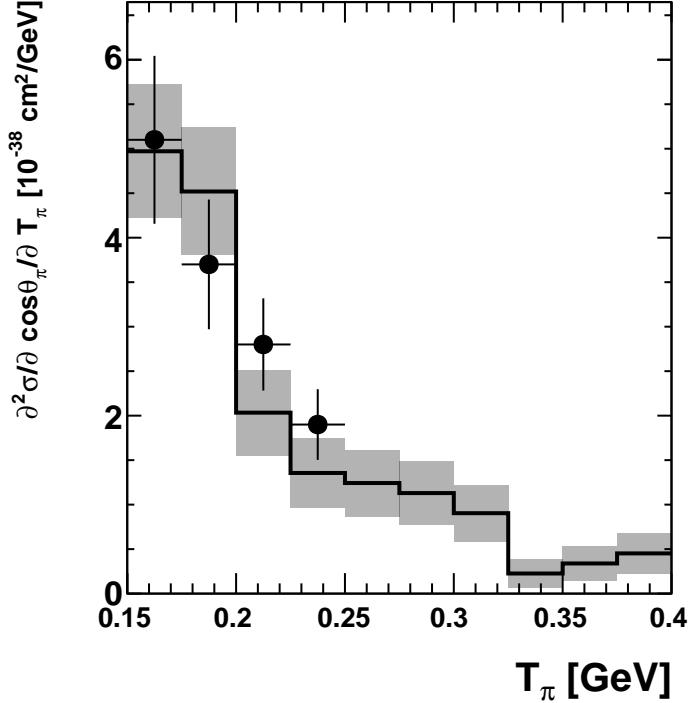
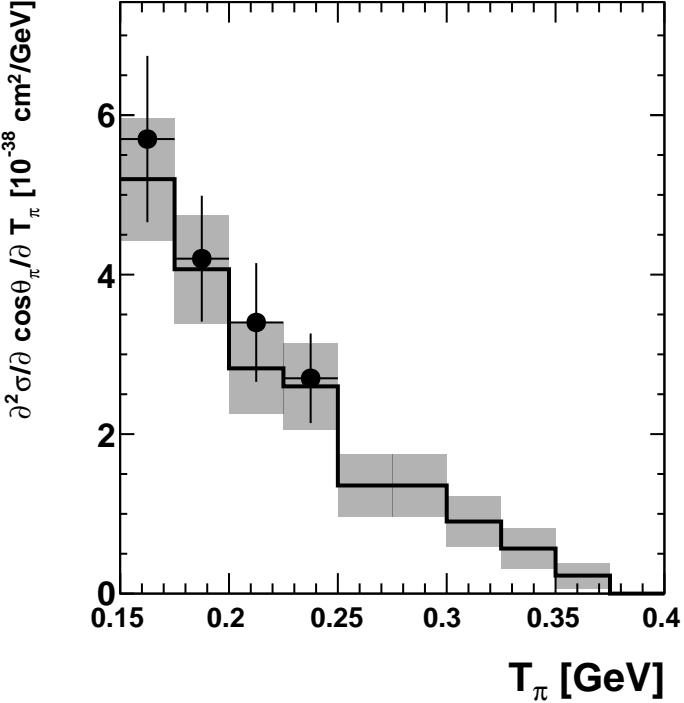
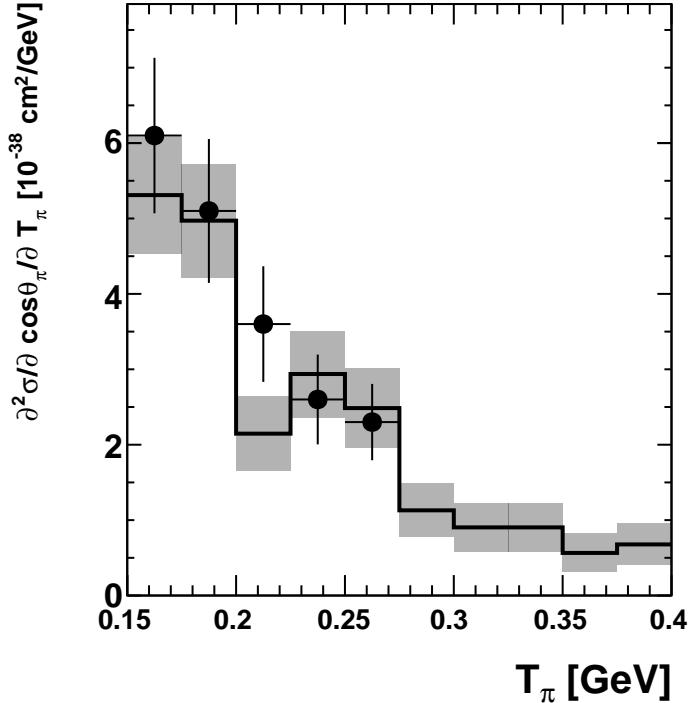
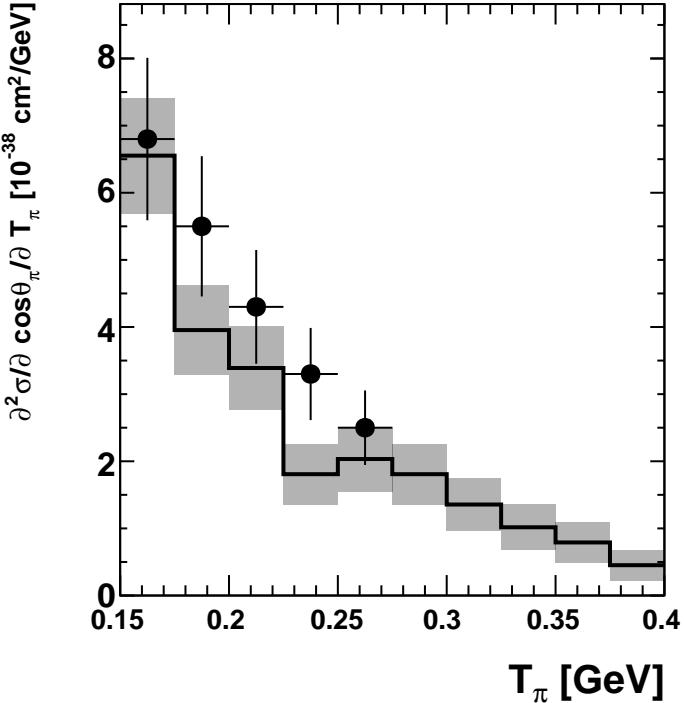
miniboone\_nucc1pip\_2011

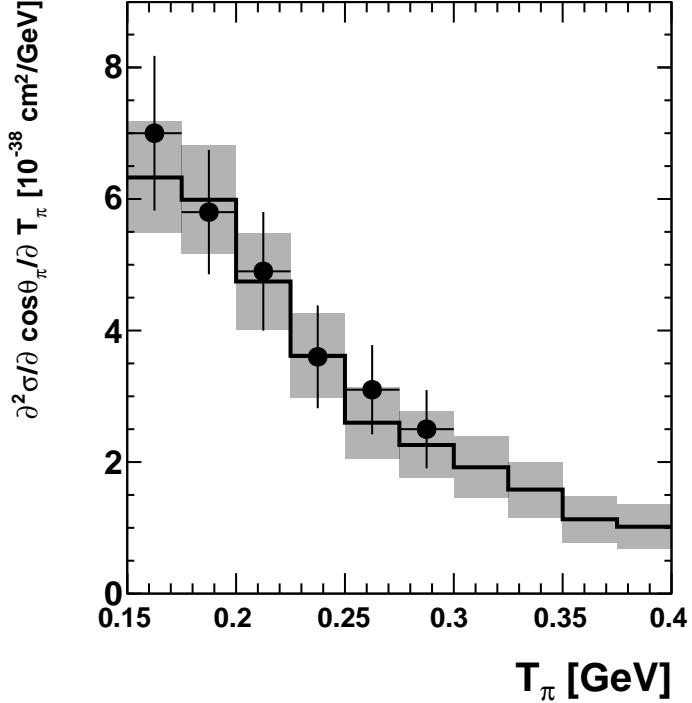
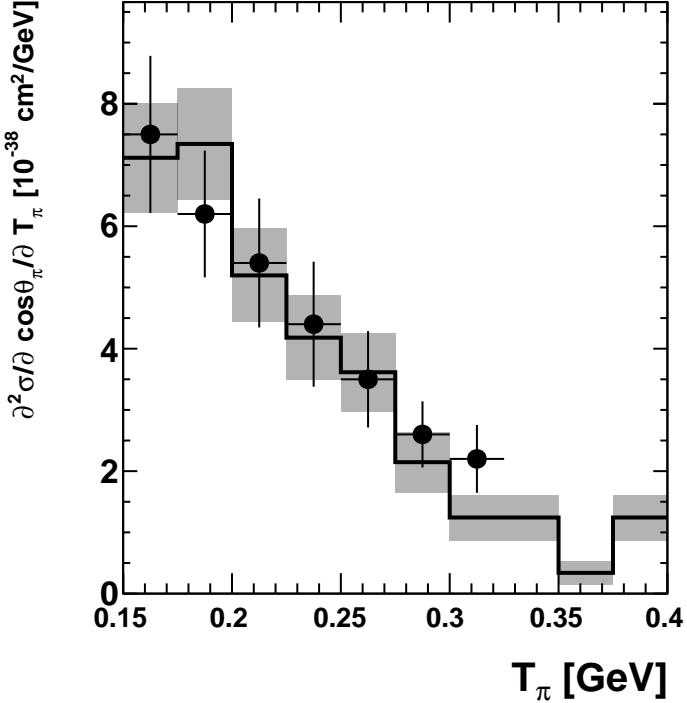
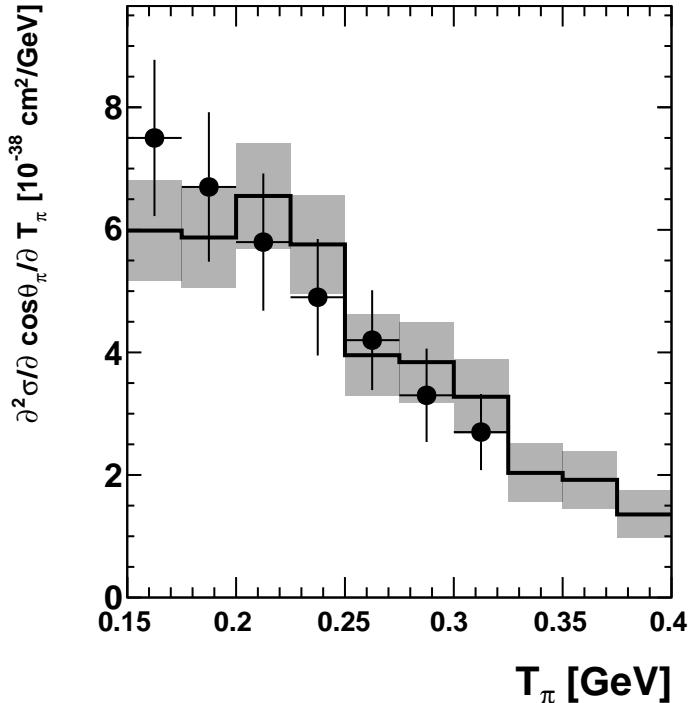
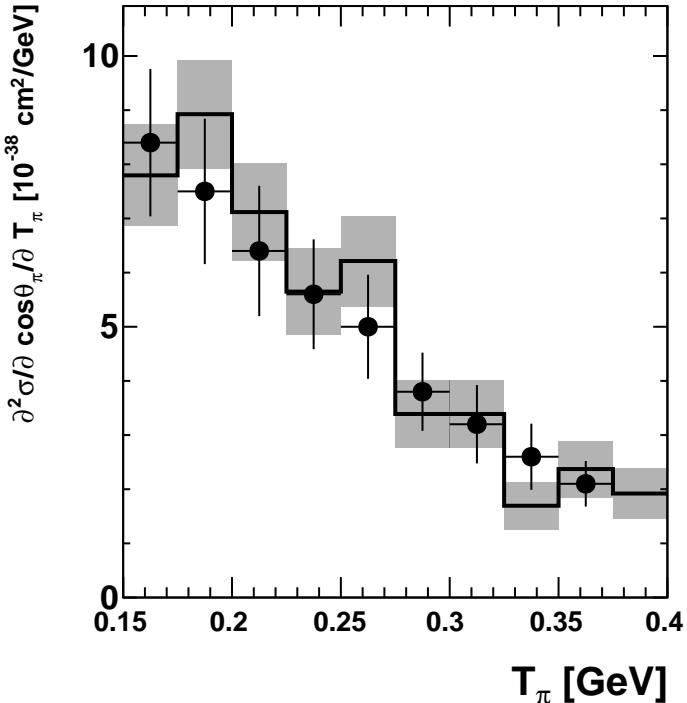
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 5.54/9 \text{ DoF}$



$\cos\theta_\pi \in [-0.25; -0.2 ]$  $\cos\theta_\pi \in [-0.2; -0.15 ]$  $\cos\theta_\pi \in [-0.15; -0.1 ]$  $\cos\theta_\pi \in [-0.1; -0.05 ]$ 

$\cos\theta_\pi \in [-0.05; 0]$  $\cos\theta_\pi \in [0; 0.05]$  $\cos\theta_\pi \in [0.05; 0.1]$  $\cos\theta_\pi \in [0.1; 0.15]$ 

$\cos\theta_\pi \in [0.15; 0.2]$  $\cos\theta_\pi \in [0.2; 0.25]$  $\cos\theta_\pi \in [0.25; 0.3]$  $\cos\theta_\pi \in [0.3; 0.35]$ 

$\cos\theta_\pi \in [0.35; 0.4]$  $\cos\theta_\pi \in [0.4; 0.45]$  $\cos\theta_\pi \in [0.45; 0.5]$  $\cos\theta_\pi \in [0.5; 0.55]$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 0.684/6$  DoF

miniboone\_nucc1pip\_2011

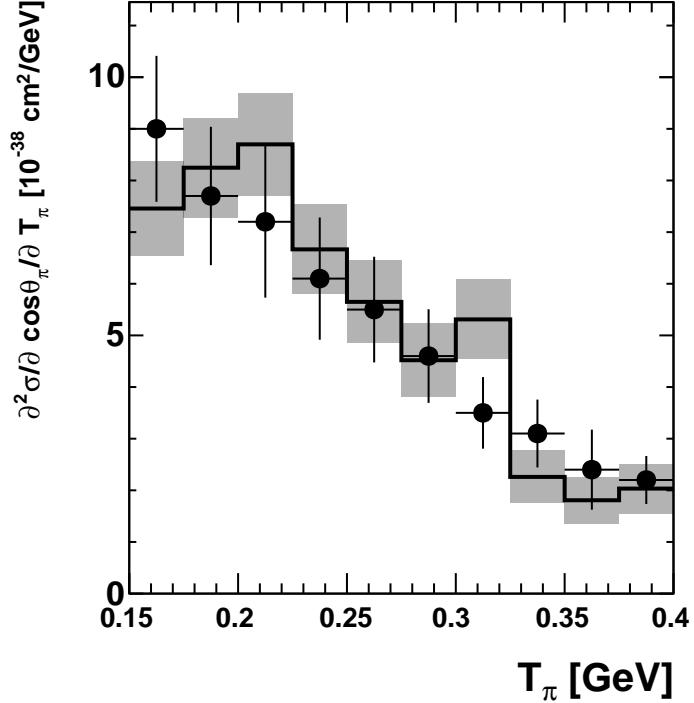
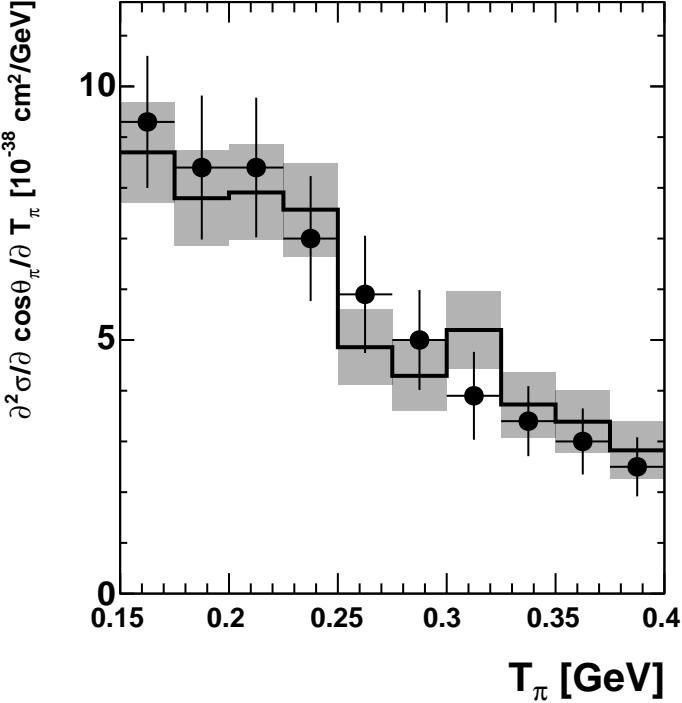
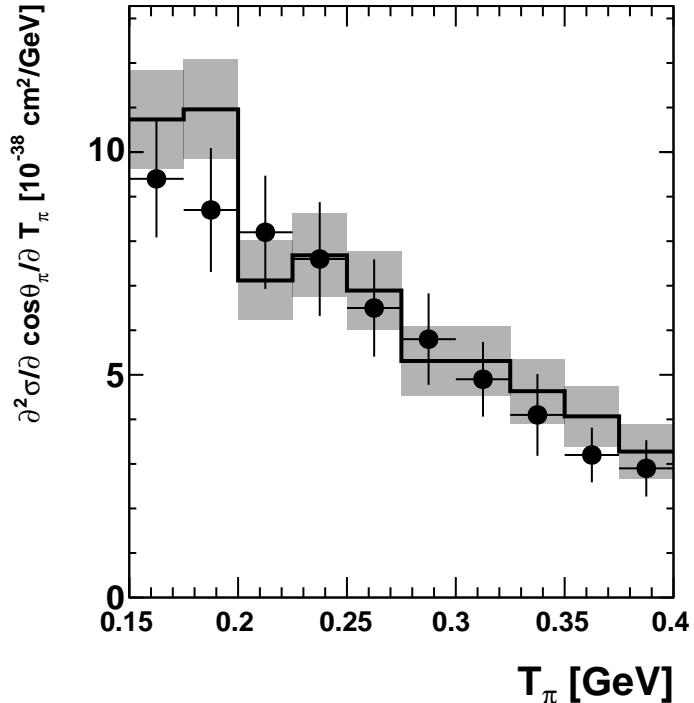
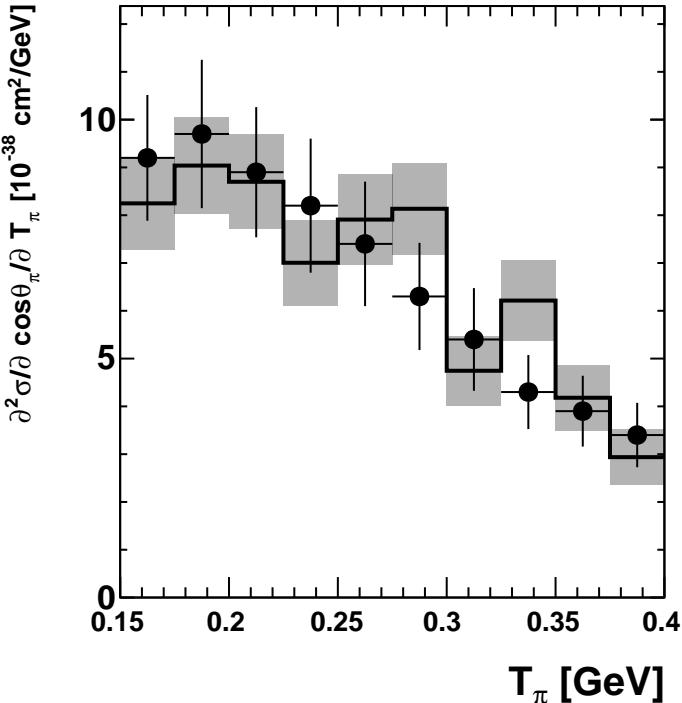
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 3.25/7$  DoF

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 2.85/7$  DoF

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 3.84/9$  DoF

$\cos\theta_\pi \in [0.55; 0.6]$  $\cos\theta_\pi \in [0.6; 0.65]$  $\cos\theta_\pi \in [0.65; 0.7]$  $\cos\theta_\pi \in [0.7; 0.75]$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.39/10 \text{ DoF}$ 

miniboone\_nucc1pip\_2011

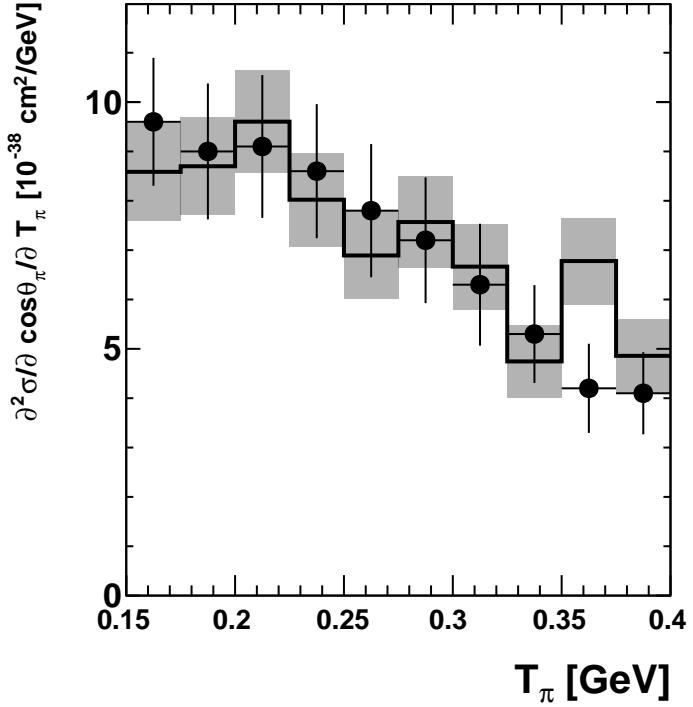
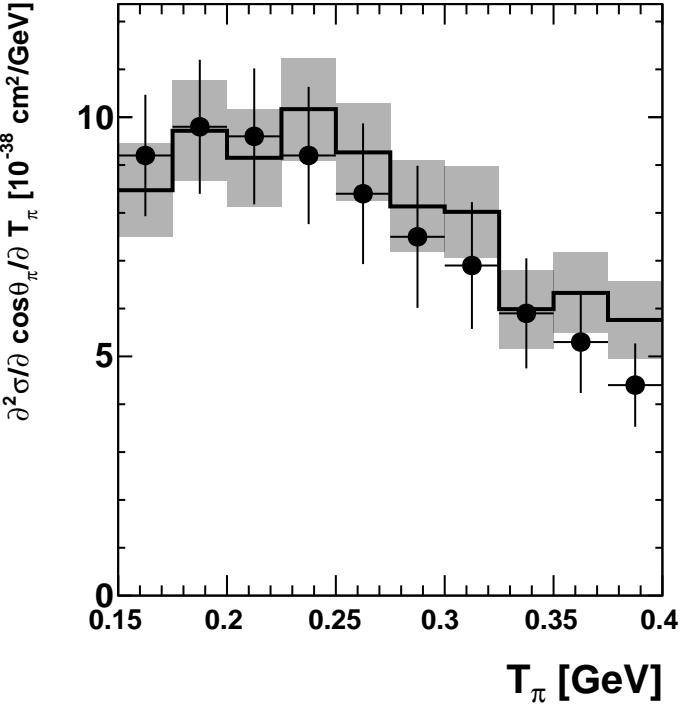
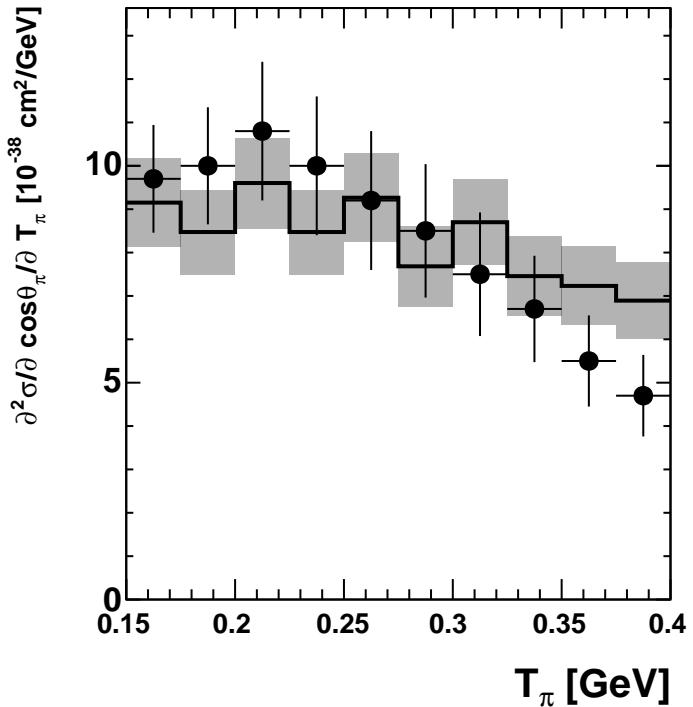
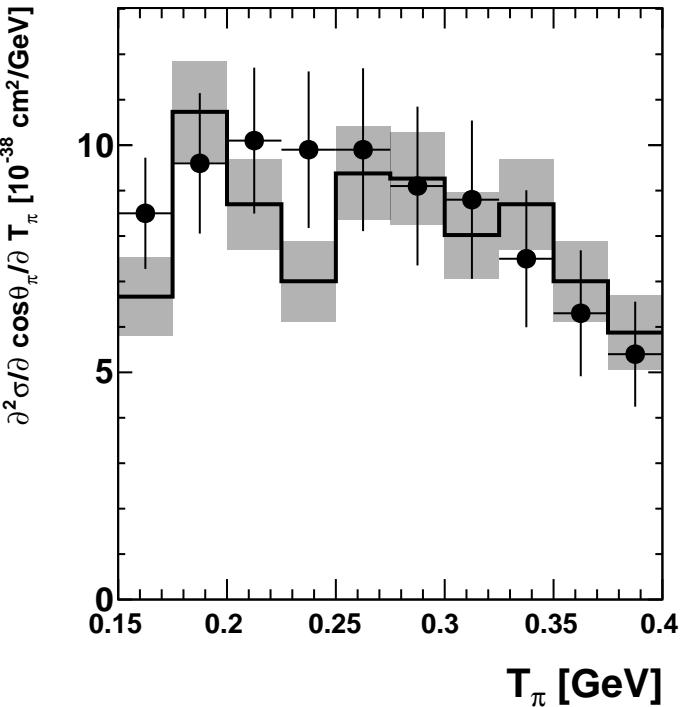
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 3.13/10 \text{ DoF}$ 

miniboone\_nucc1pip\_2011

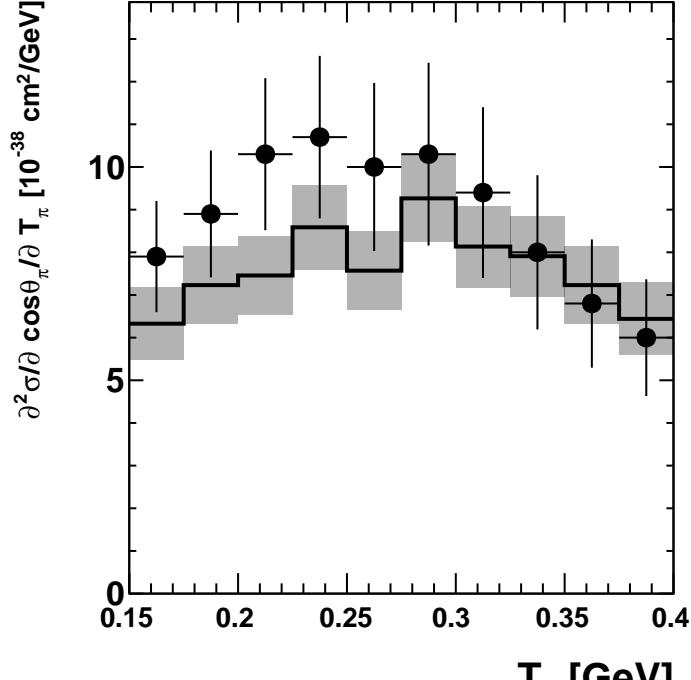
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 4.34/10 \text{ DoF}$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.07/10 \text{ DoF}$

$\cos\theta_\pi \in [0.75; 0.8]$  $\cos\theta_\pi \in [0.8; 0.85]$  $\cos\theta_\pi \in [0.85; 0.9]$  $\cos\theta_\pi \in [0.9; 0.95]$ 

$\cos\theta_\pi \in [0.95; 1]$

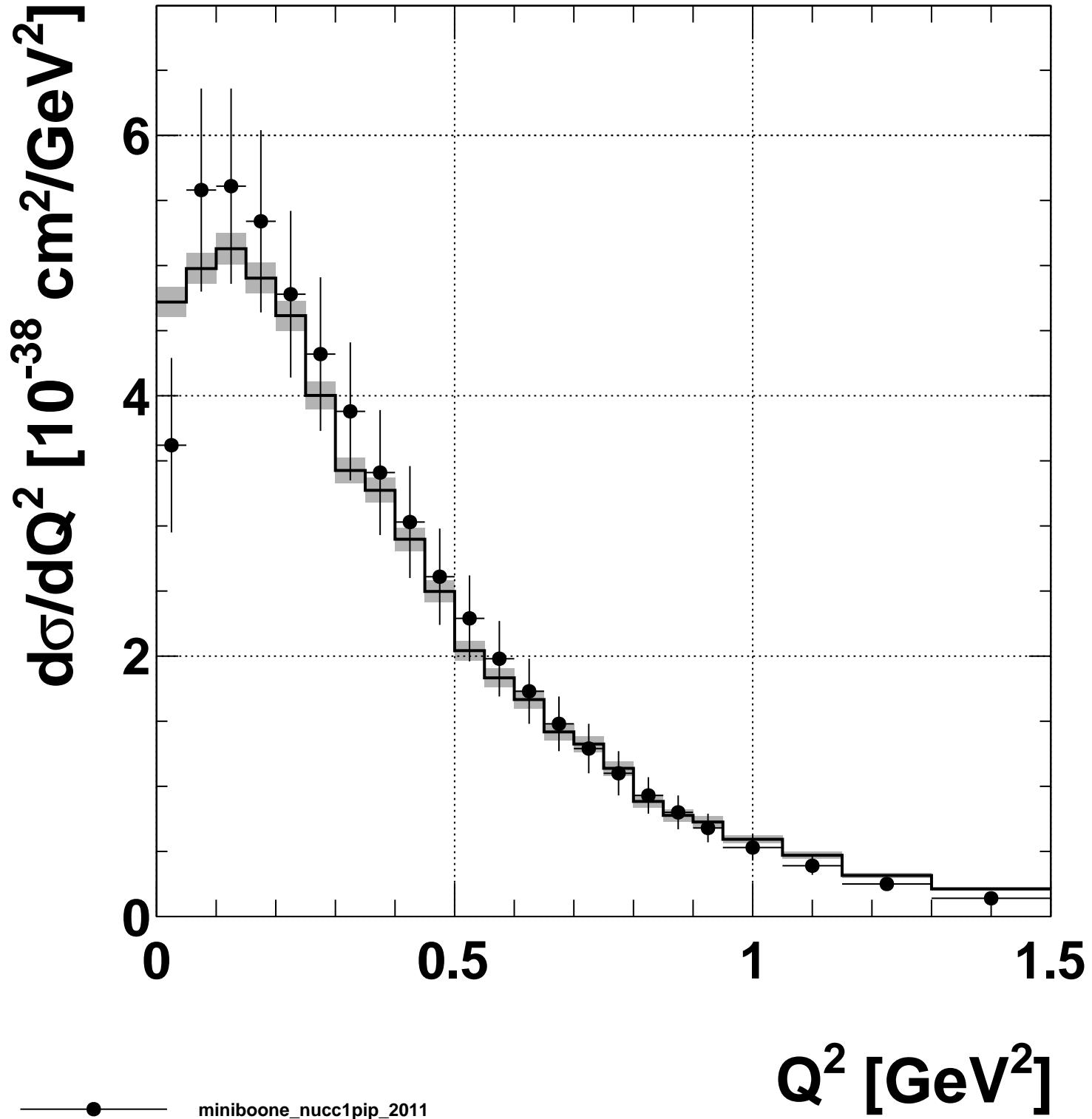


● miniboone\_nucc1pip\_2011

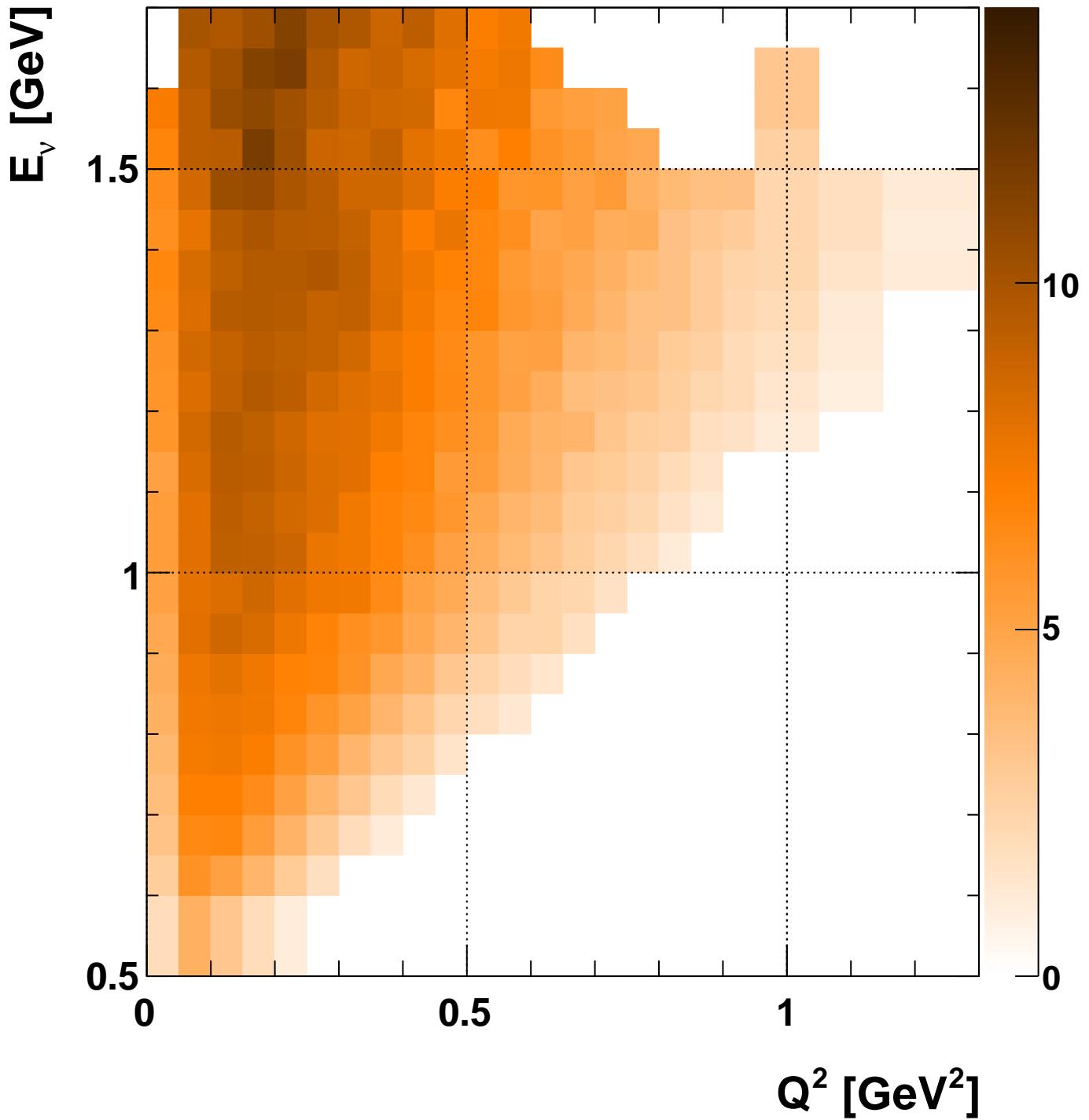
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.83/10$  DoF



© 2003-2018, GENIE - <http://www.genie-mc.org>

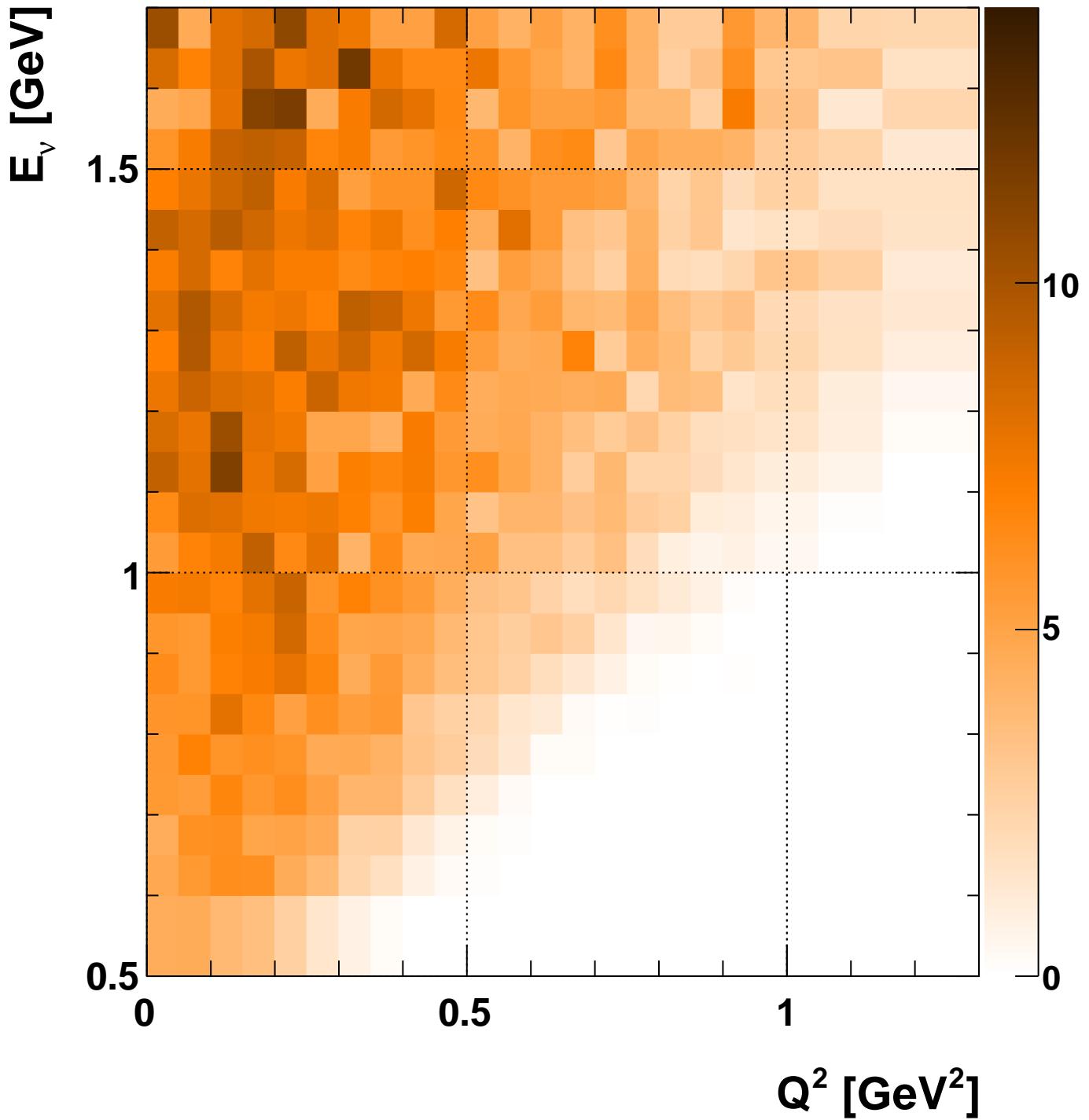


© 2003-2018, GENIE - <http://www.genie-mc.org>



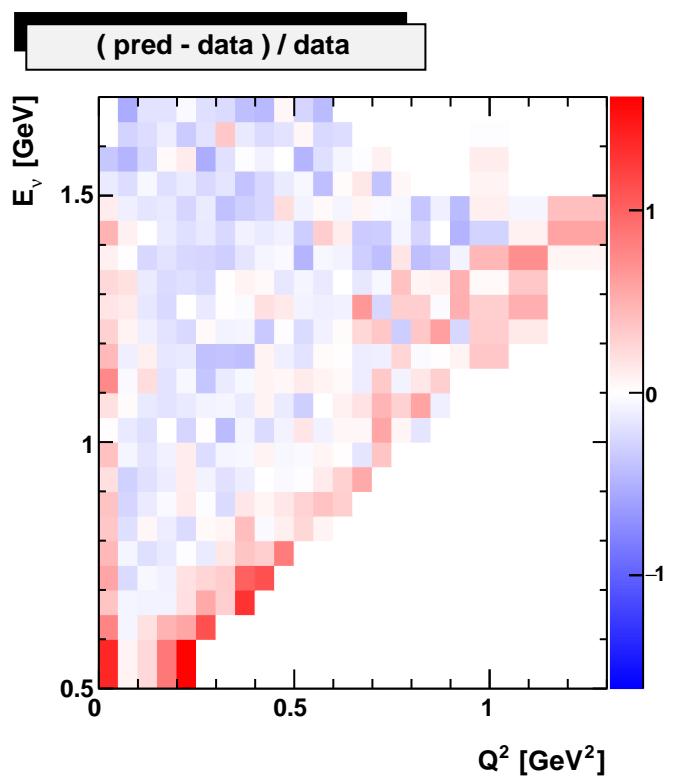
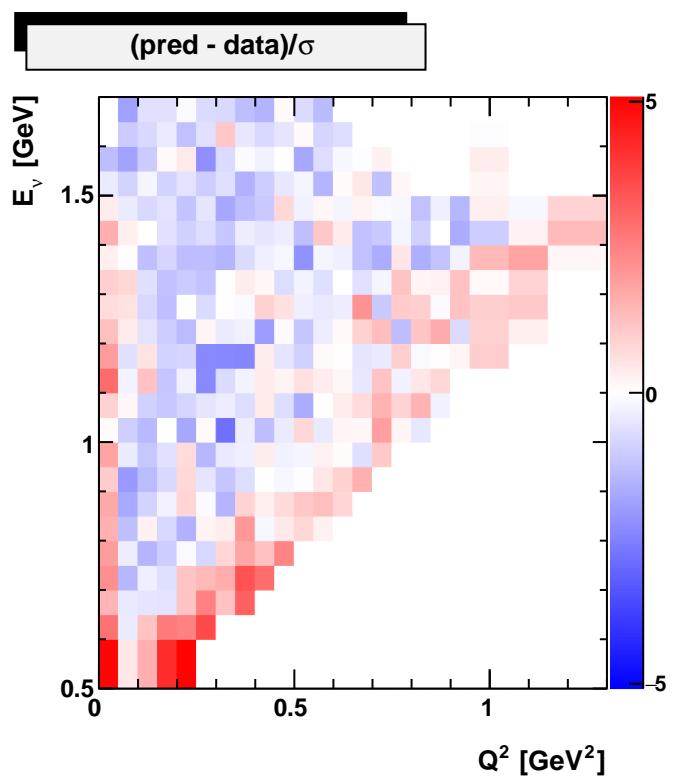
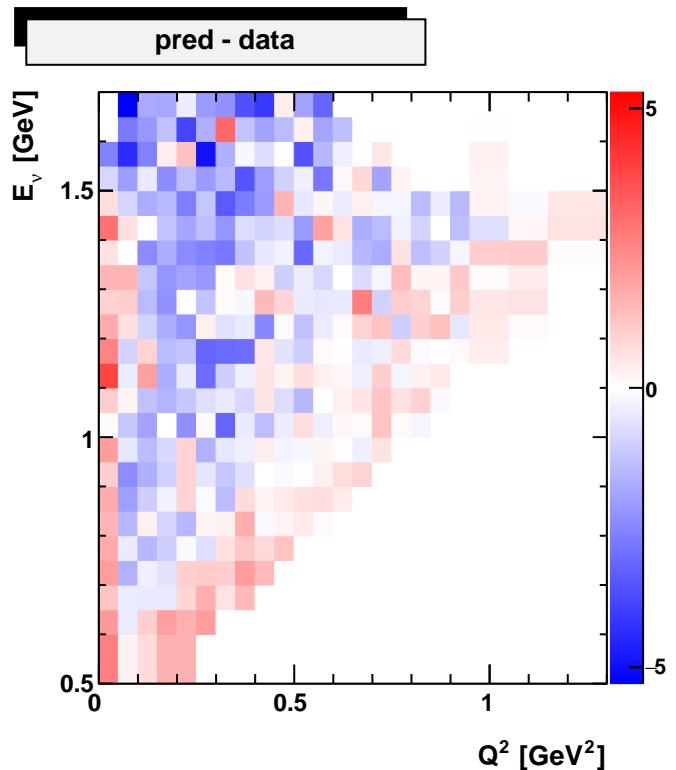
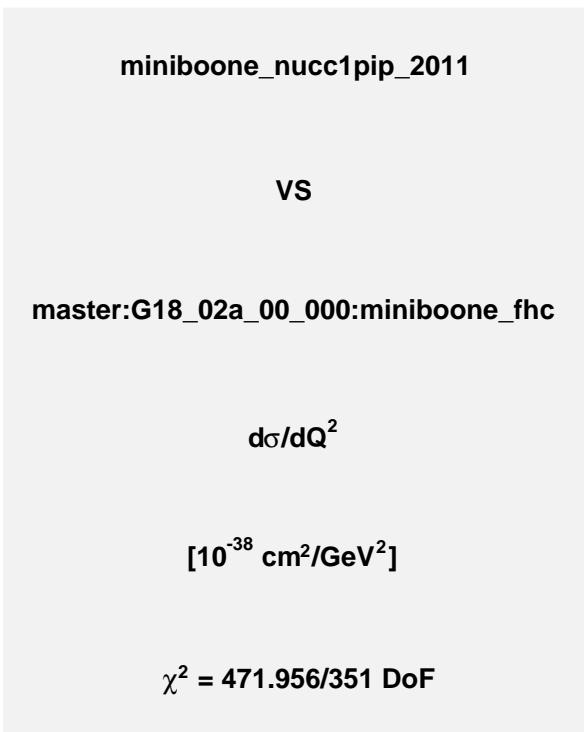
Data: miniboone\_nucc1pip\_2011

© 2003-2018, GENIE - <http://www.genie-mc.org>

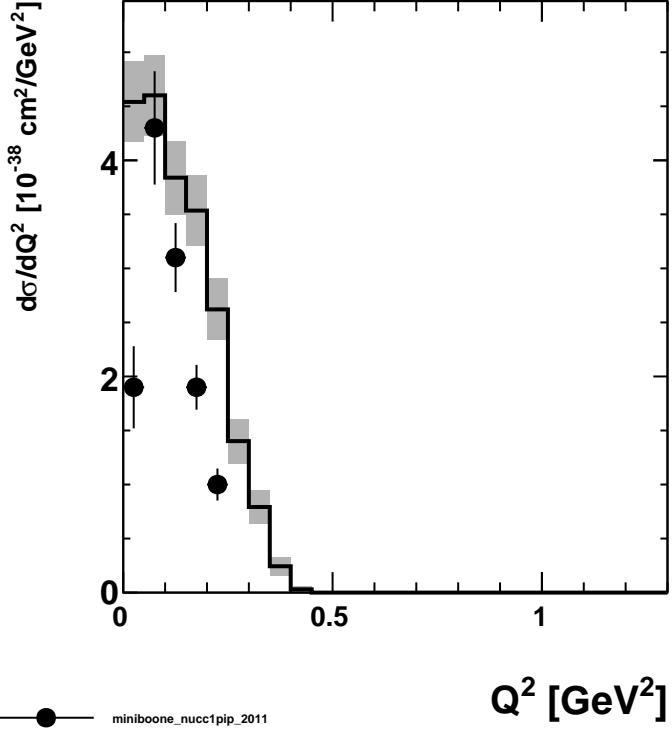
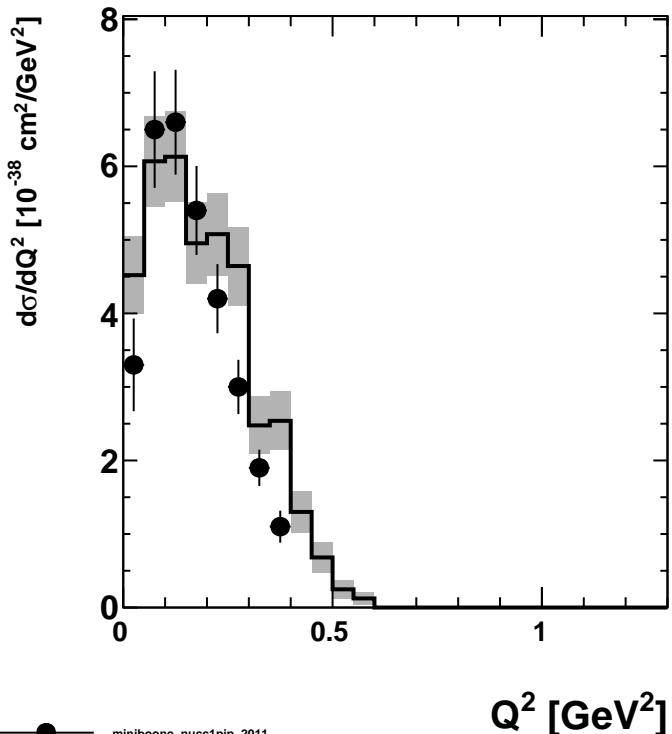
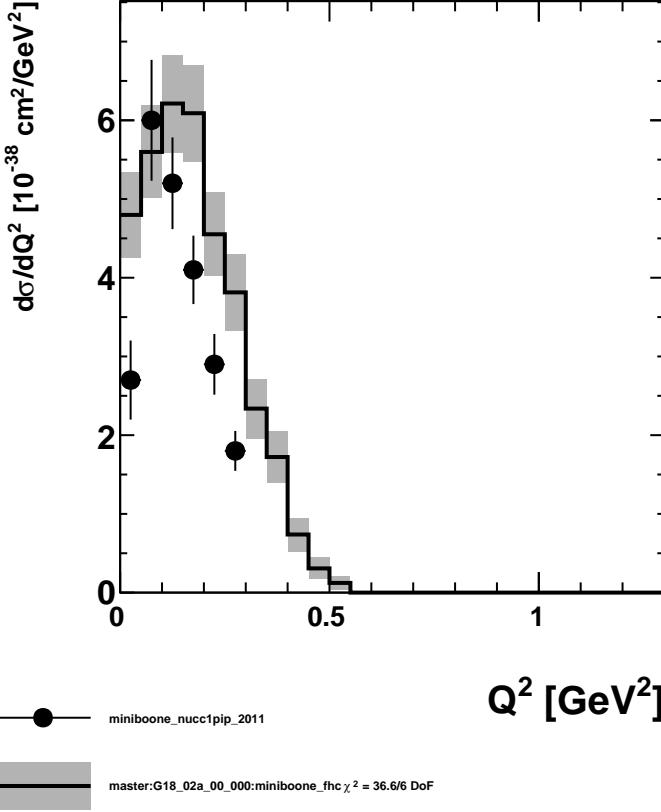
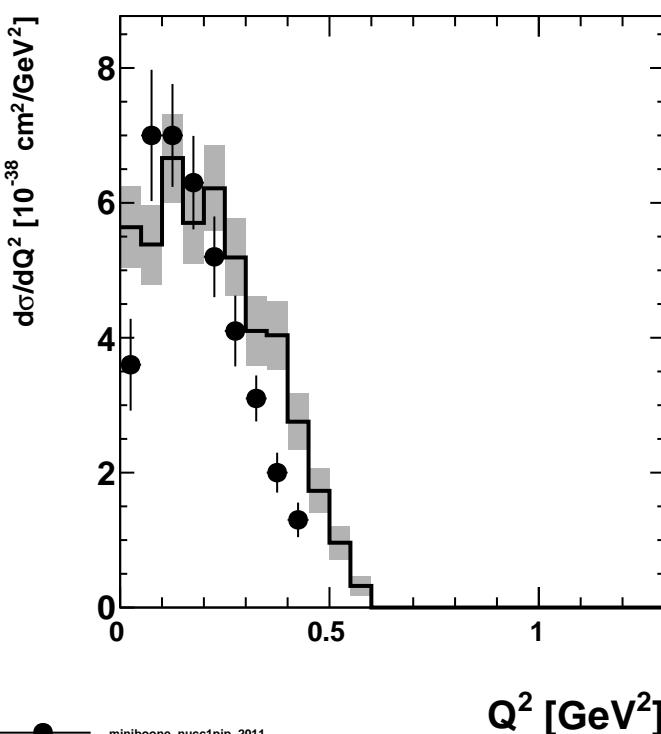


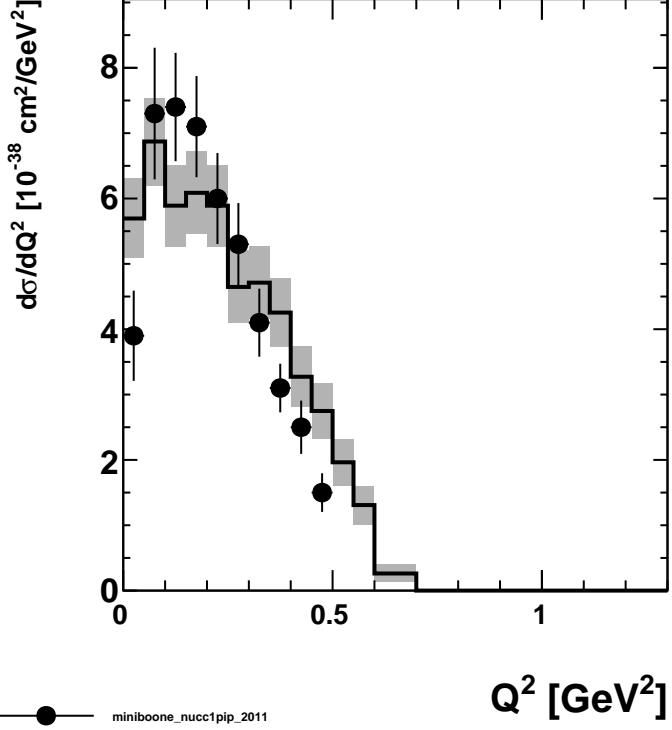
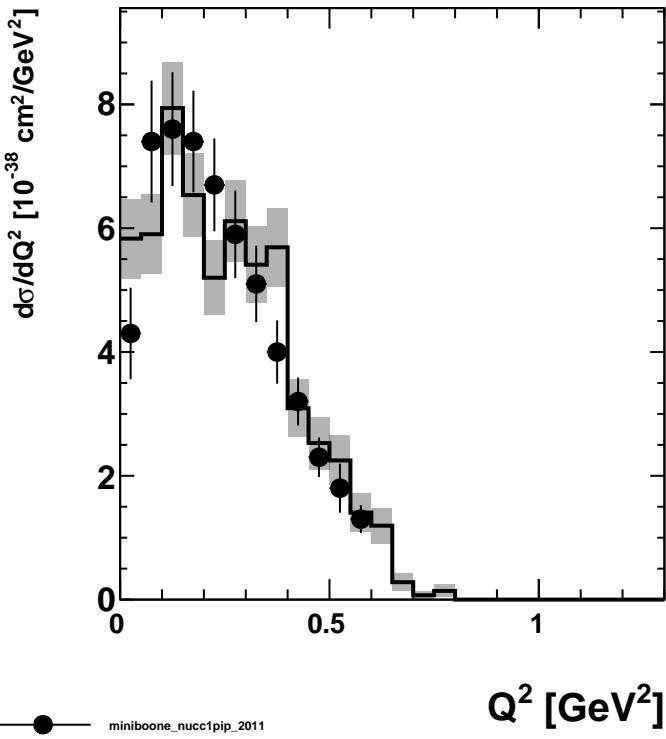
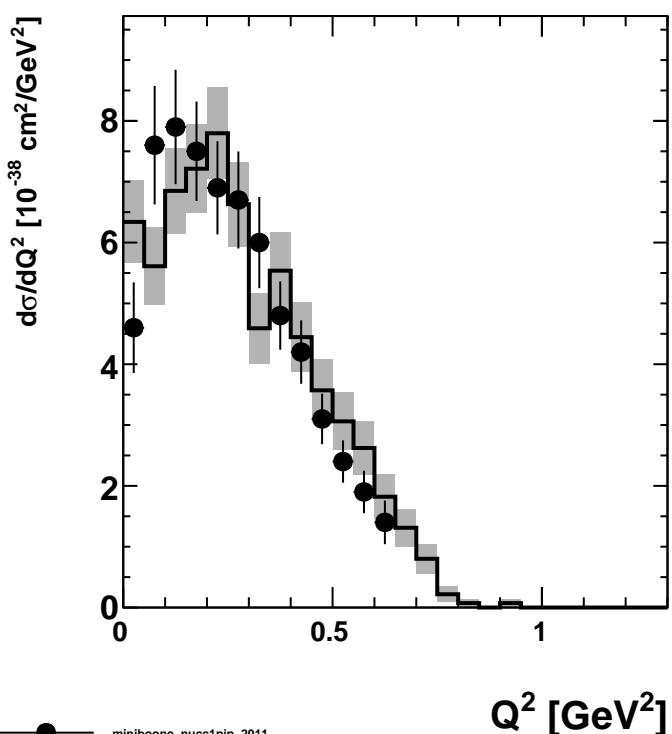
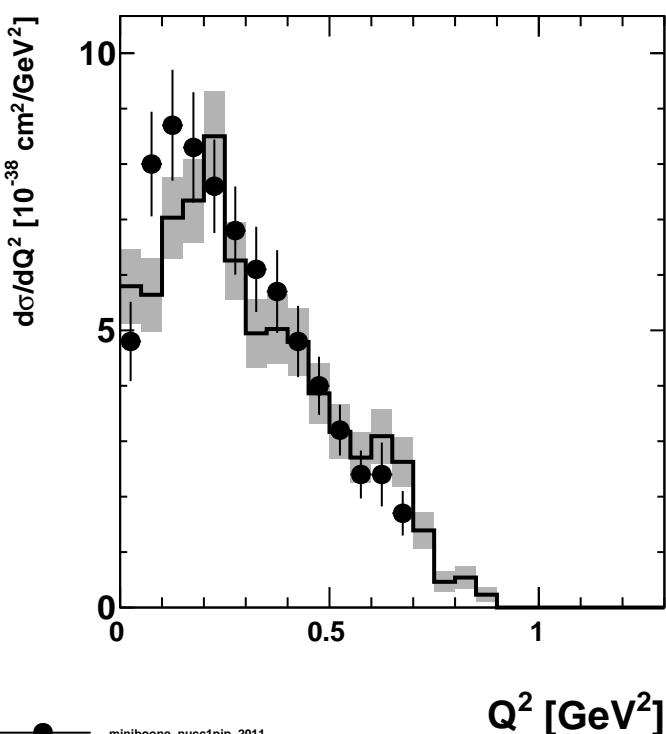
$d\sigma/dQ^2$  [ $10^{-38}$  cm $^2$ /GeV $^2$ ]

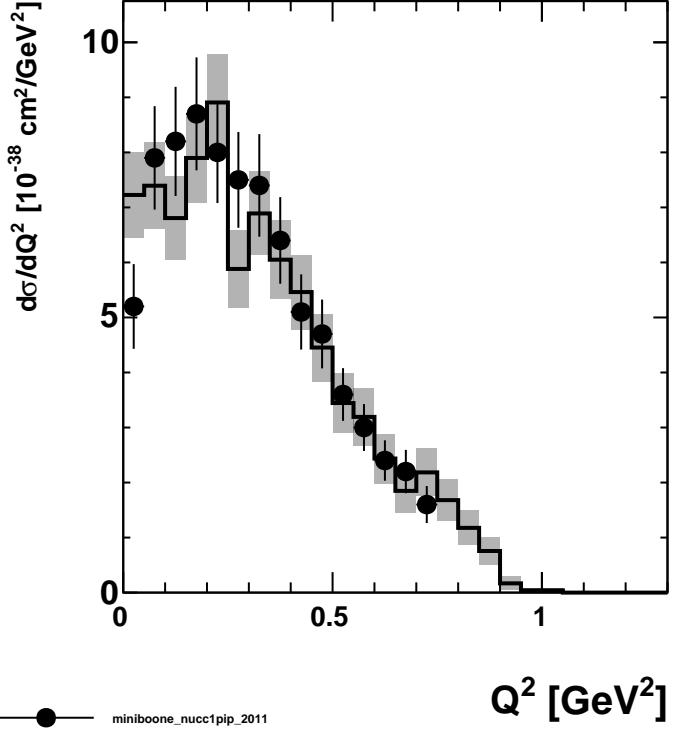
Pred: master:G18\_02a\_00\_000:miniboone\_fhc



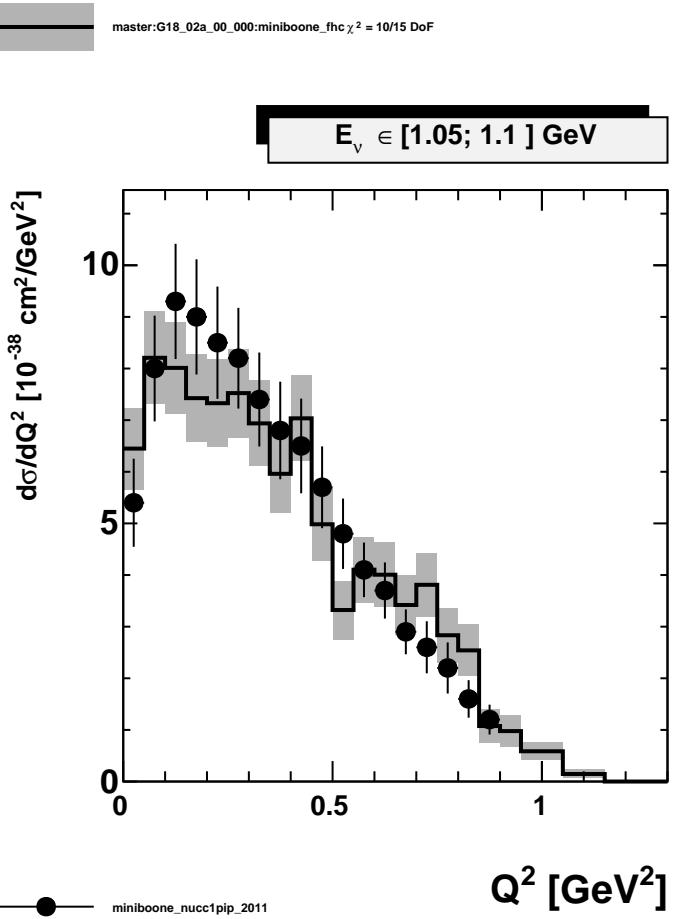


$E_\nu \in [0.5; 0.6] \text{ GeV}$  $E_\nu \in [0.6; 0.65] \text{ GeV}$  $Q^2 [\text{GeV}^2]$ miniboone\_nucc1pip\_2011  
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 70.9/5$  DoF $E_\nu \in [0.65; 0.7] \text{ GeV}$  $Q^2 [\text{GeV}^2]$ miniboone\_nucc1pip\_2011  
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 22.4/8$  DoF $Q^2 [\text{GeV}^2]$ miniboone\_nucc1pip\_2011  
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 36.6/6$  DoF $E_\nu \in [0.7; 0.75] \text{ GeV}$  $Q^2 [\text{GeV}^2]$ miniboone\_nucc1pip\_2011  
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 34.3/9$  DoF

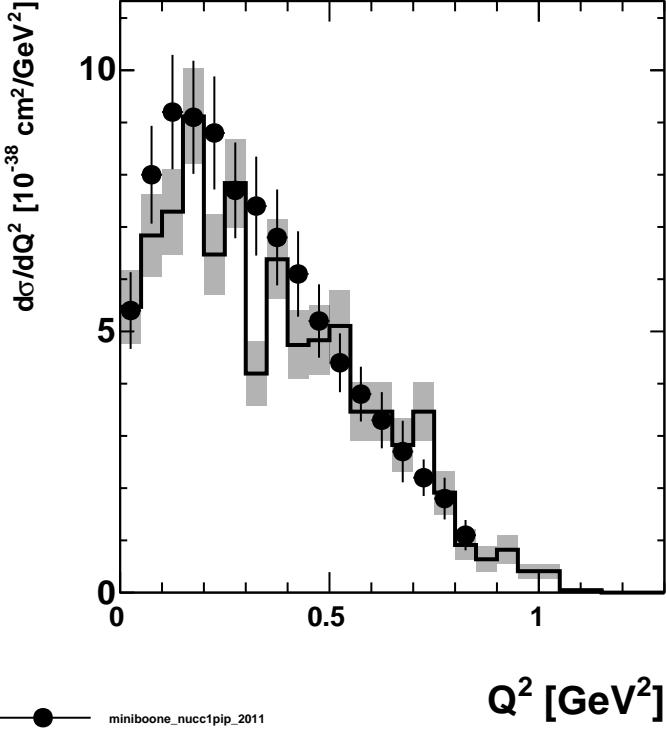
$E_\nu \in [0.75; 0.8] \text{ GeV}$  $E_\nu \in [0.8; 0.85] \text{ GeV}$  $E_\nu \in [0.85; 0.9] \text{ GeV}$  $E_\nu \in [0.9; 0.95] \text{ GeV}$ 

$E_\nu \in [0.95; 1] \text{ GeV}$ 

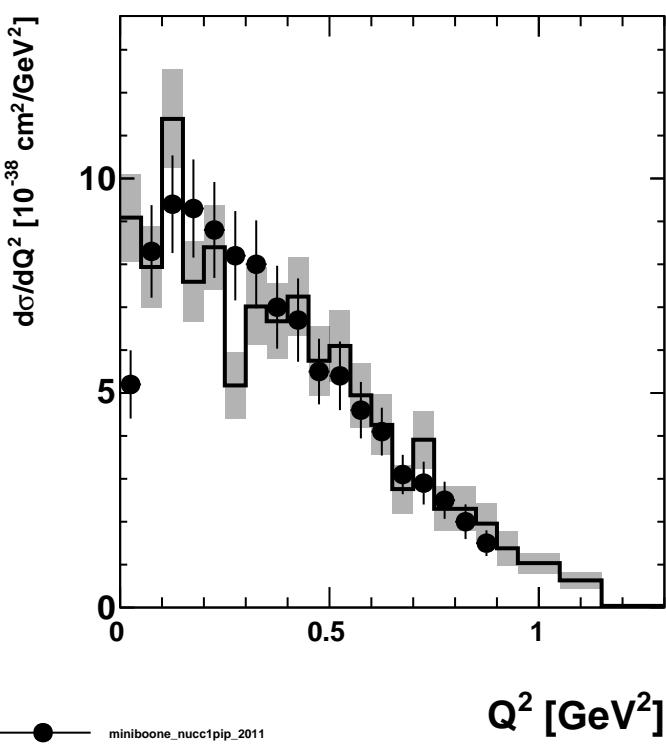
miniboone\_nucc1pip\_2011



miniboone\_nucc1pip\_2011

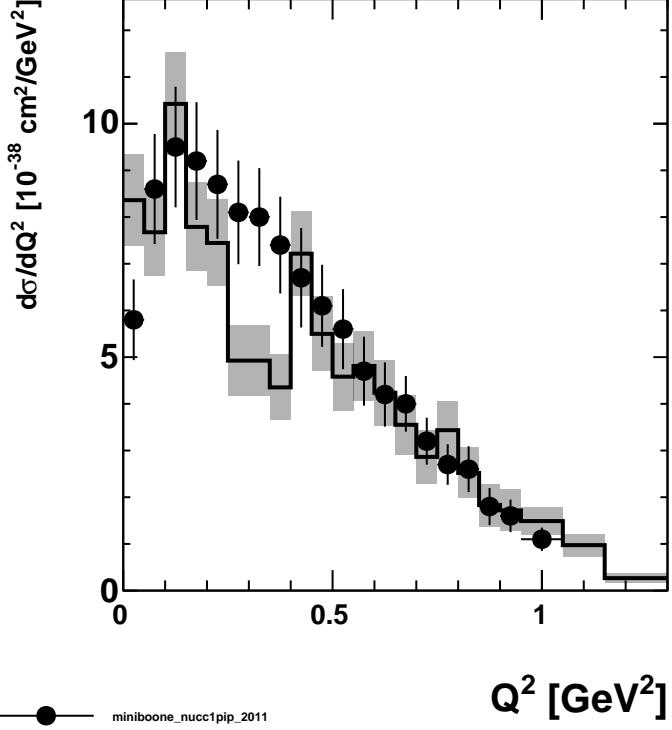
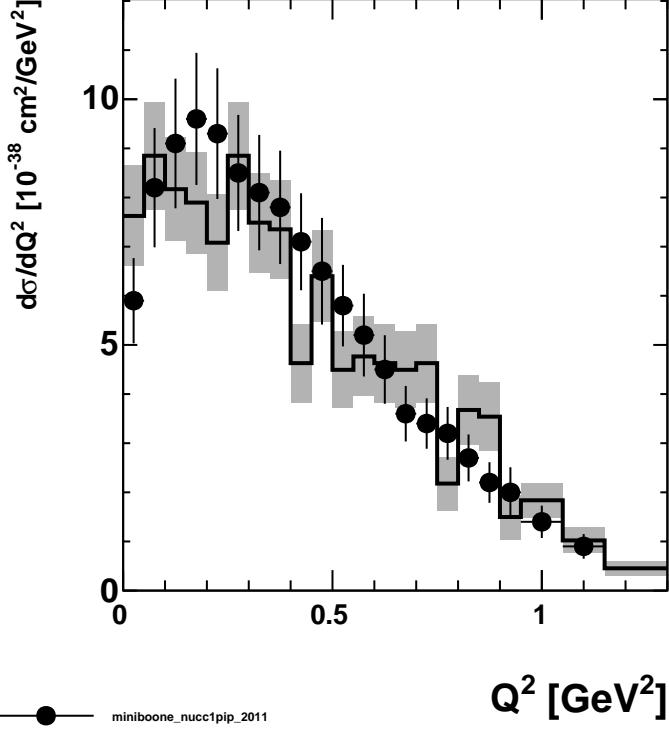
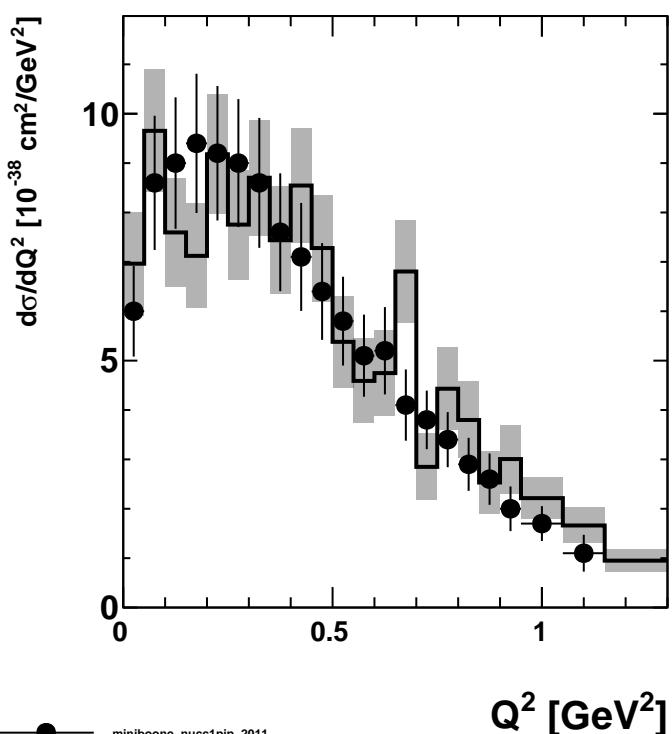
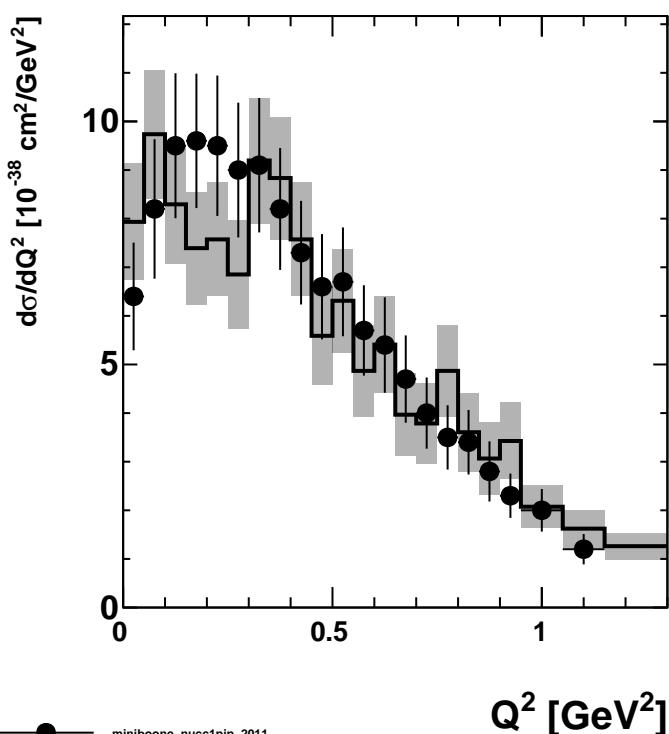
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 14.1/18 \text{ DoF}$  $E_\nu \in [1; 1.05] \text{ GeV}$ 

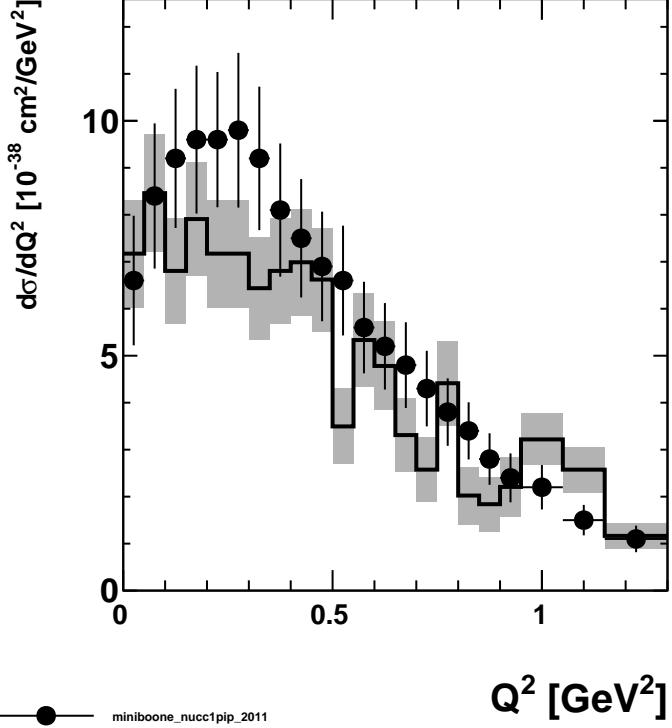
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 20.7/17 \text{ DoF}$ 

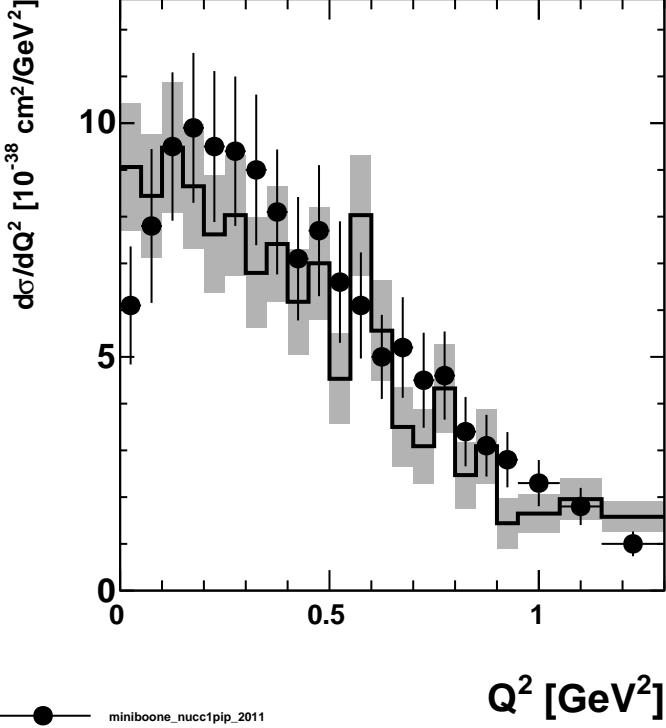
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 21.4/18 \text{ DoF}$

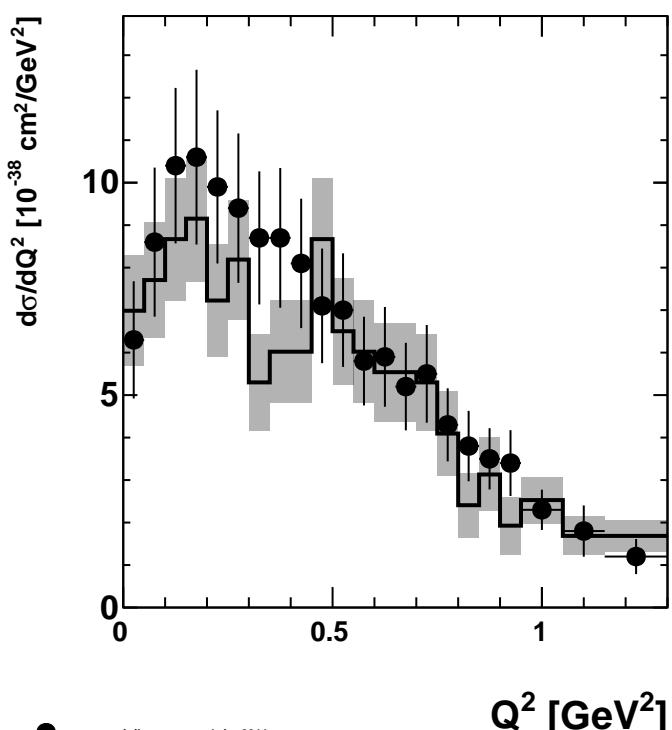
$E_\nu \in [1.15; 1.2] \text{ GeV}$  $E_\nu \in [1.2; 1.25] \text{ GeV}$  $E_\nu \in [1.25; 1.3] \text{ GeV}$  $E_\nu \in [1.3; 1.35] \text{ GeV}$ 

$E_\nu \in [1.35; 1.4] \text{ GeV}$ 

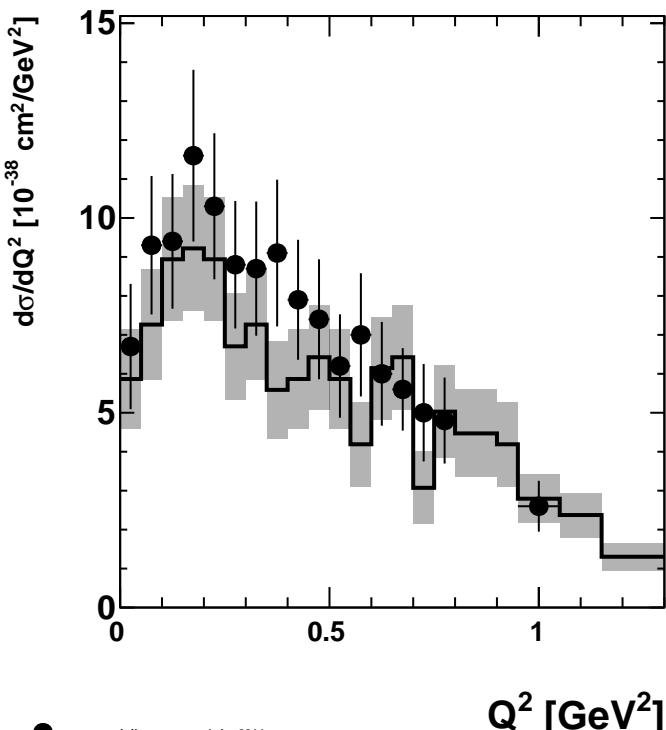
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 27.6/22$  DoF $E_\nu \in [1.4; 1.45] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

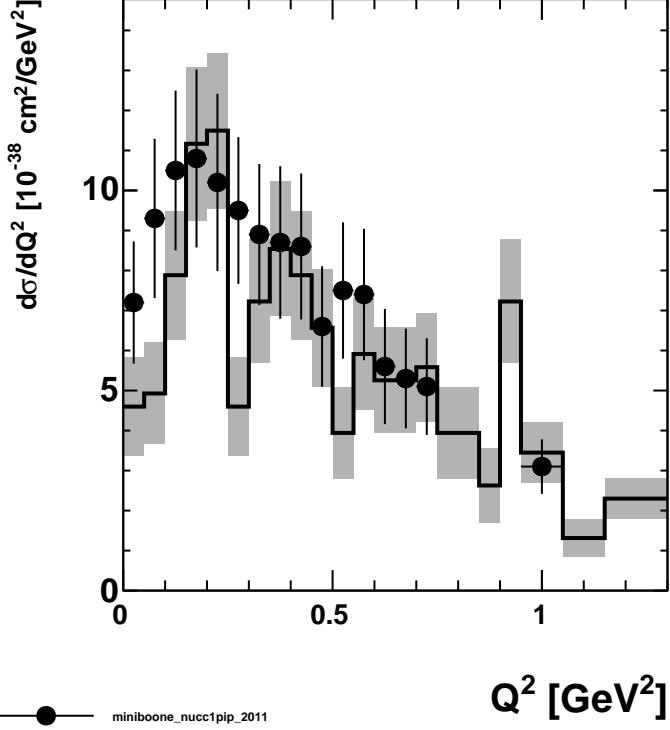
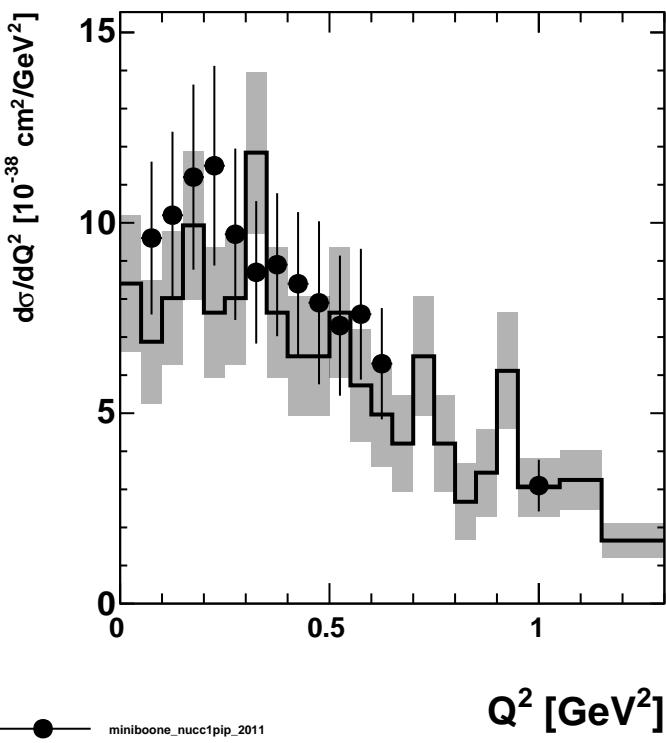
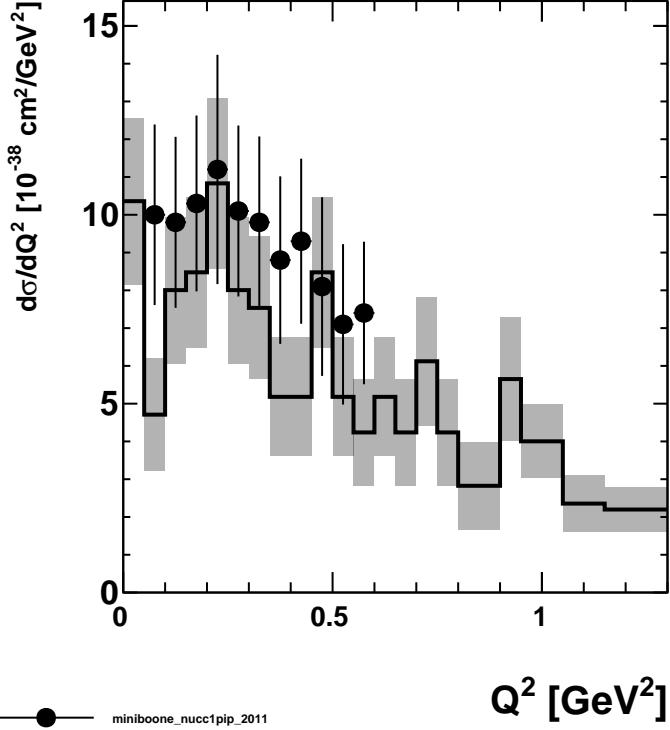
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 18.5/22$  DoF $E_\nu \in [1.45; 1.5] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 14.3/22$  DoF $E_\nu \in [1.5; 1.55] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

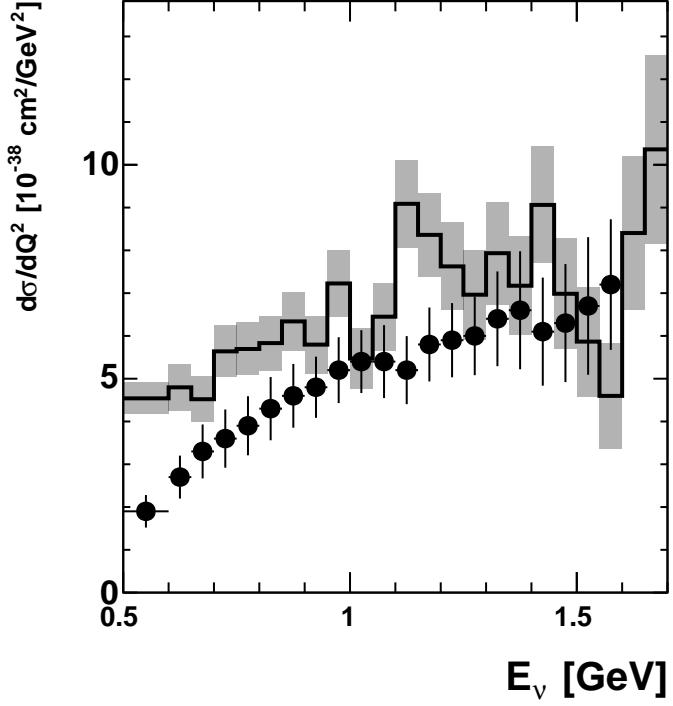
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 11.1/17$  DoF

$E_\nu \in [1.55; 1.6] \text{ GeV}$  $E_\nu \in [1.6; 1.65] \text{ GeV}$  $E_\nu \in [1.65; 1.7] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

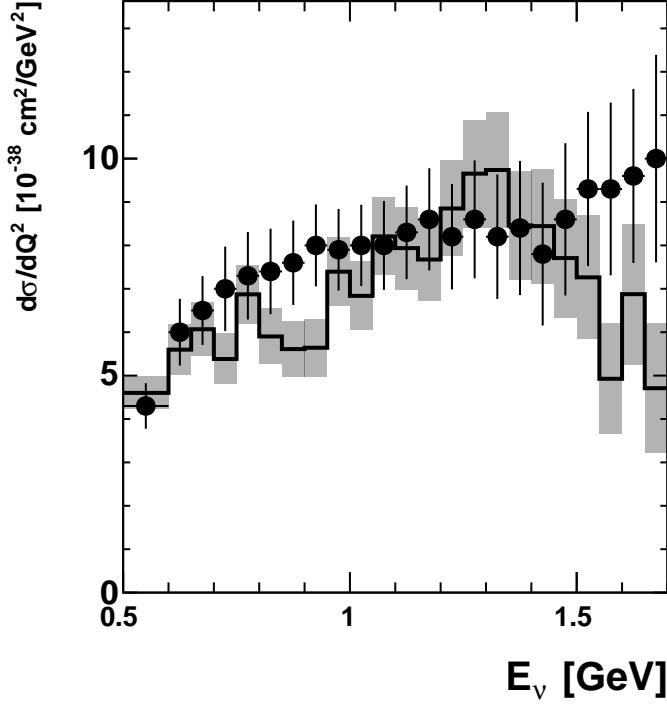
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 15.7/16 \text{ DoF}$



$Q^2 \in [0; 0.05] \text{ GeV}^2$  $Q^2 \in [0.05; 0.1] \text{ GeV}^2$ 

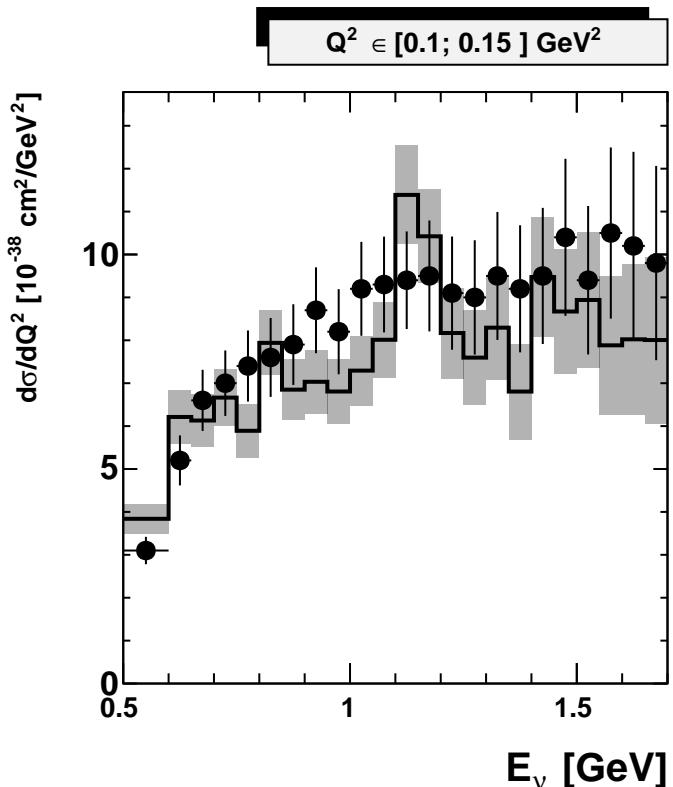
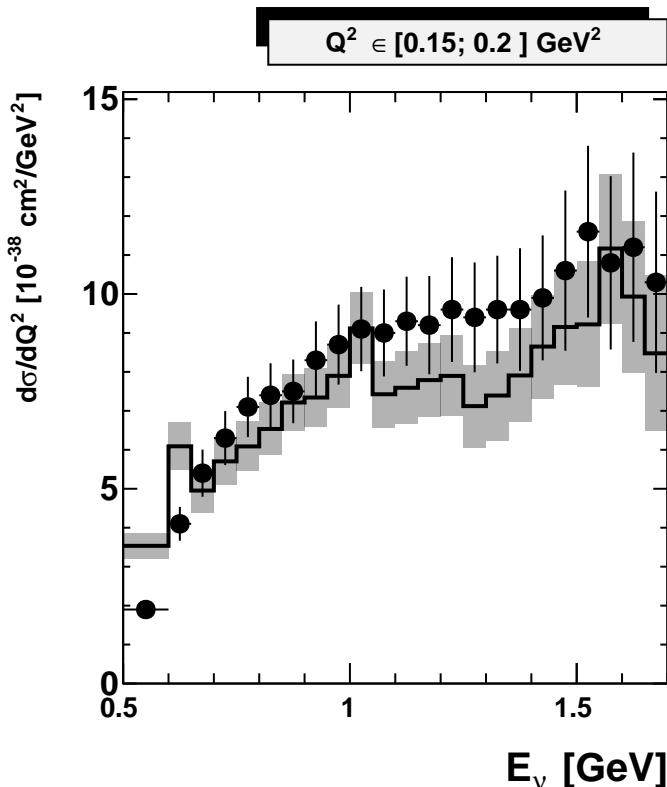
—

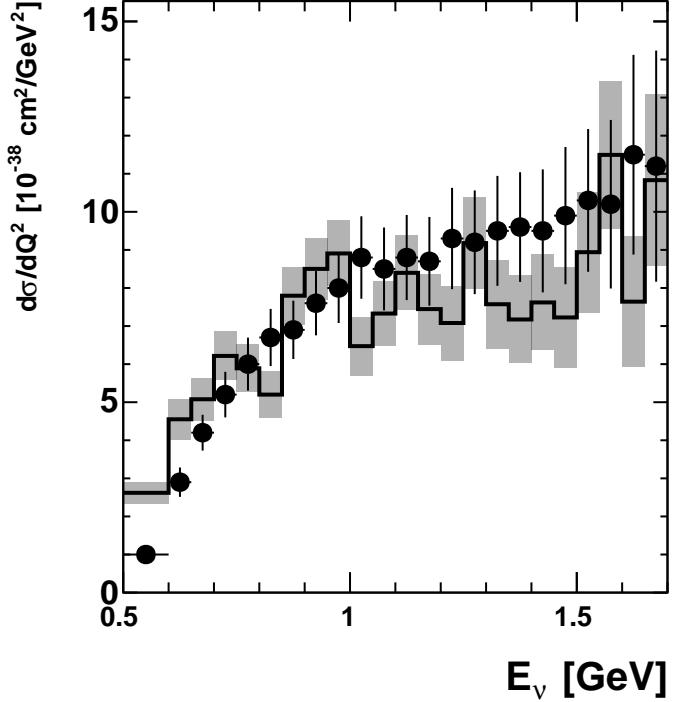
miniboone\_nucc1pip\_2011

 $\chi^2 = 75/21 \text{ DoF}$ 

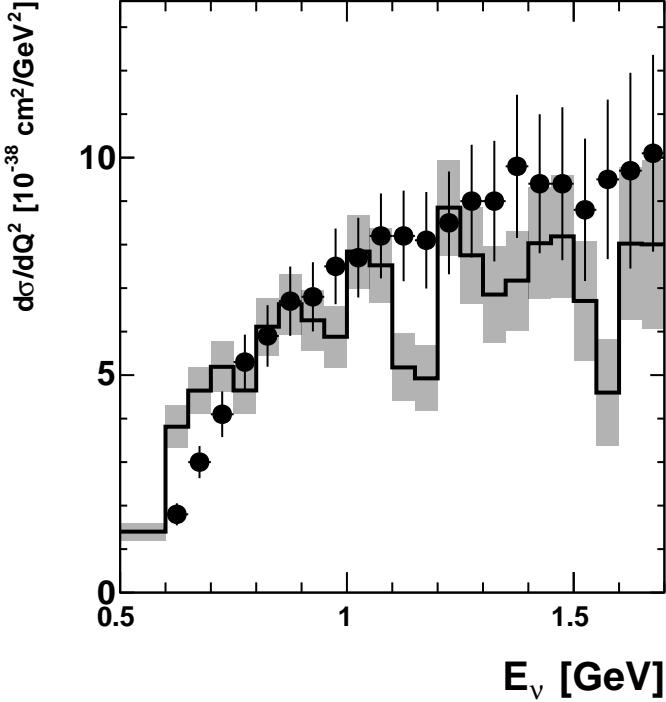
—

miniboone\_nucc1pip\_2011

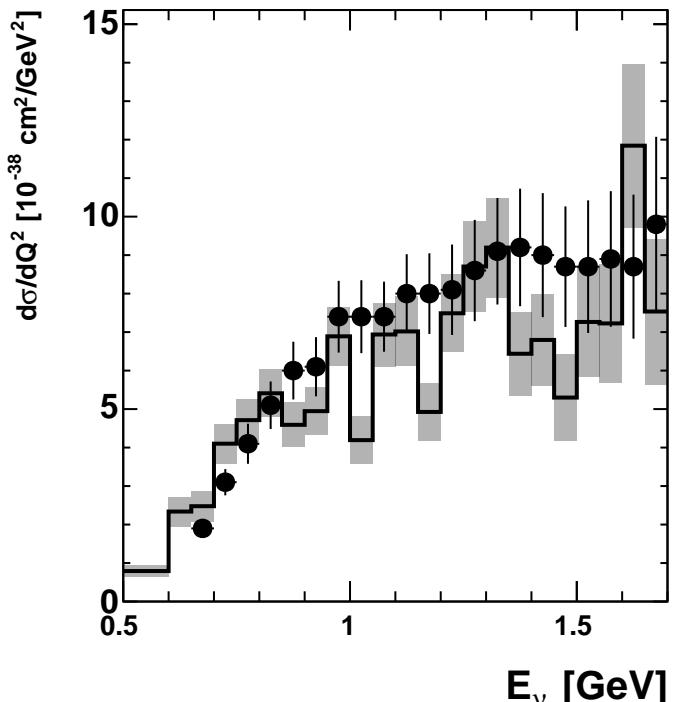
 $\chi^2 = 23.2/23 \text{ DoF}$  $\chi^2 = 20.5/23 \text{ DoF}$  $\chi^2 = 38.5/23 \text{ DoF}$

$Q^2 \in [0.2; 0.25] \text{ GeV}^2$  $Q^2 \in [0.25; 0.3] \text{ GeV}^2$  $E_\nu [\text{GeV}]$ 

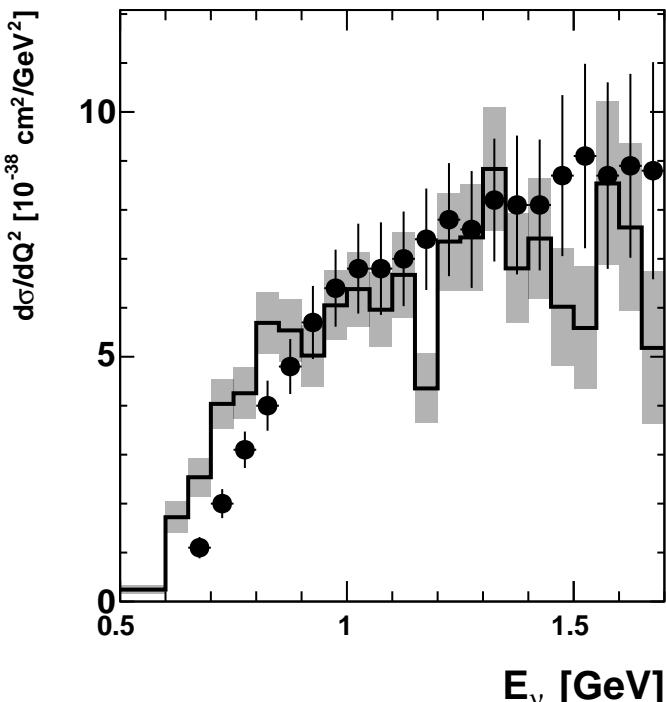
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 52.7/23 \text{ DoF}$  $E_\nu [\text{GeV}]$ 

miniboone\_nucc1pip\_2011

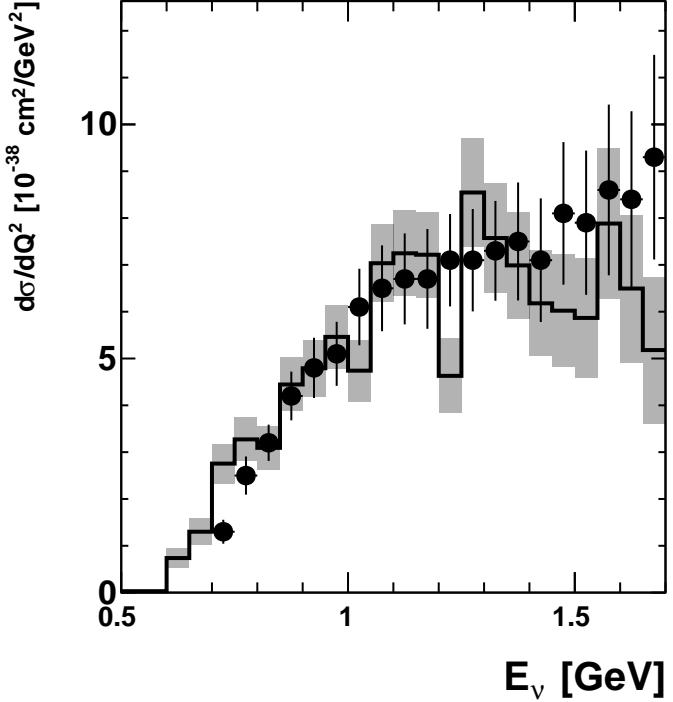
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 47.5/22 \text{ DoF}$  $Q^2 \in [0.3; 0.35] \text{ GeV}^2$  $Q^2 \in [0.35; 0.4] \text{ GeV}^2$  $E_\nu [\text{GeV}]$ 

miniboone\_nucc1pip\_2011

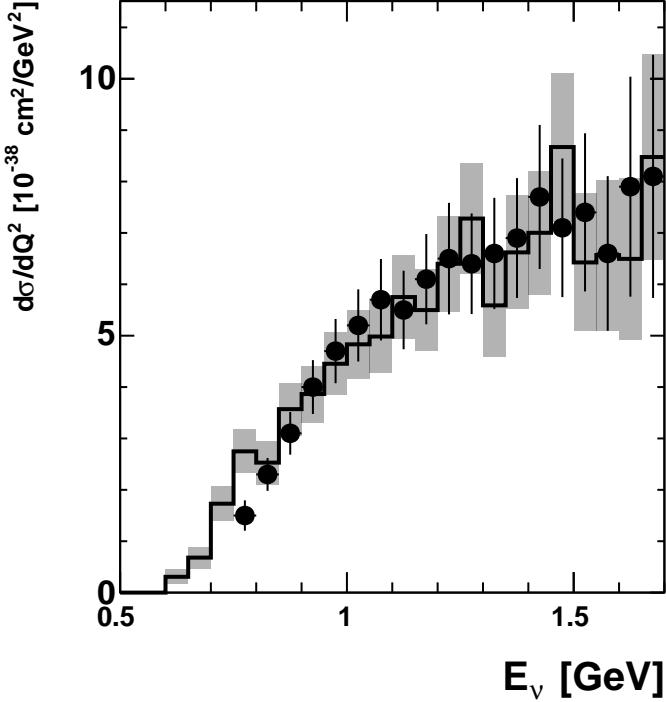
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 32.5/21 \text{ DoF}$  $E_\nu [\text{GeV}]$ 

miniboone\_nucc1pip\_2011

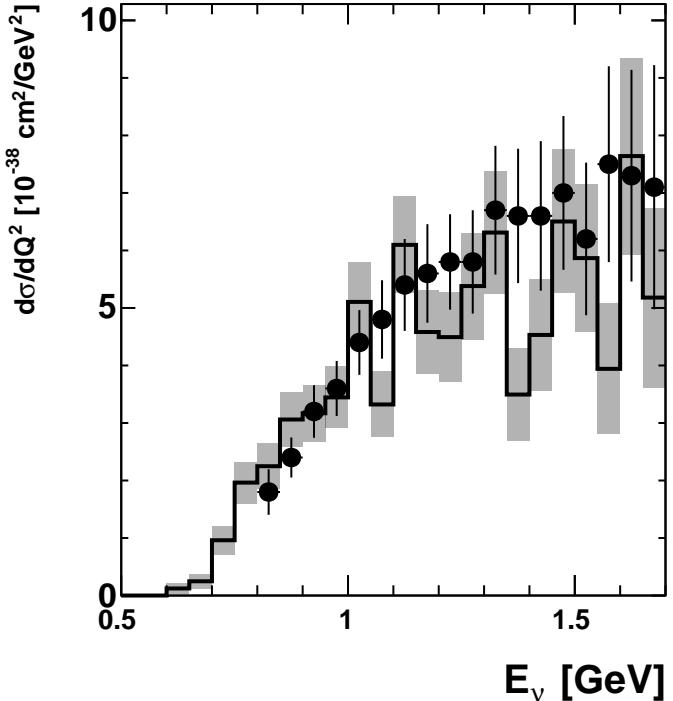
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 44.6/21 \text{ DoF}$

$Q^2 \in [0.4; 0.45] \text{ GeV}^2$ 

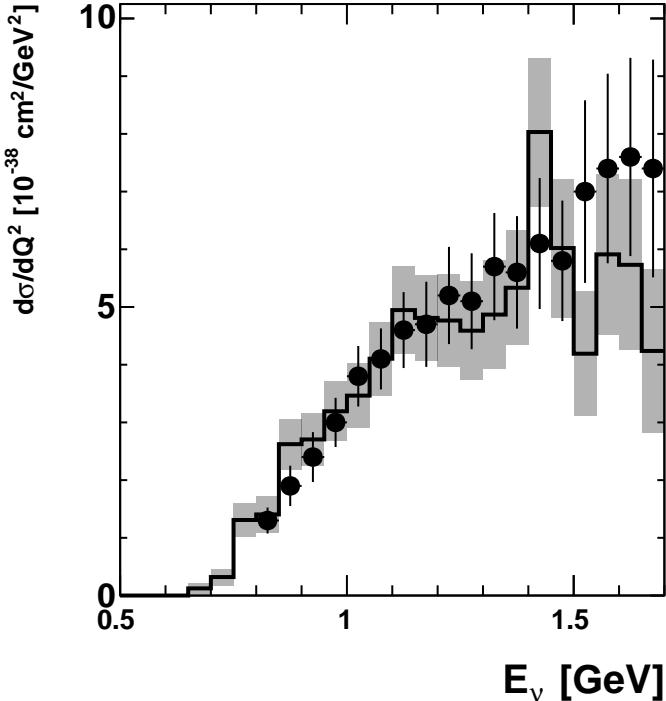
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 23/20$  DoF $Q^2 \in [0.45; 0.5] \text{ GeV}^2$ 

miniboone\_nucc1pip\_2011

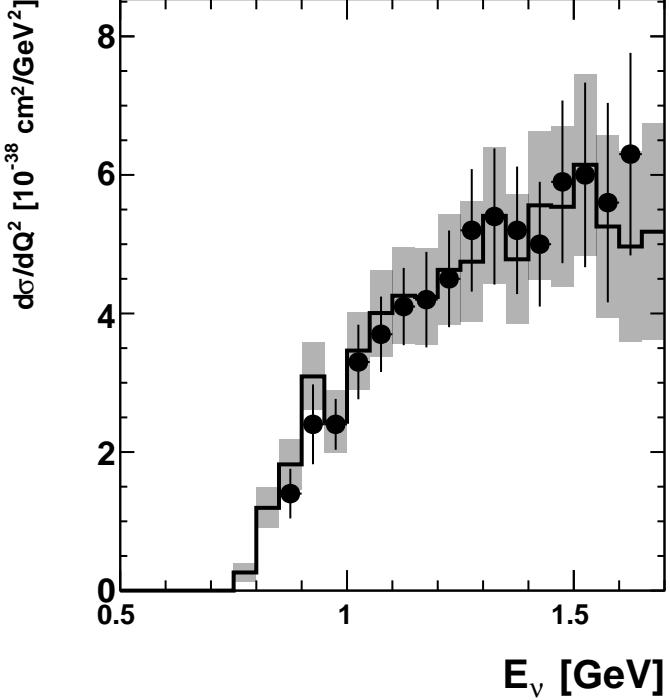
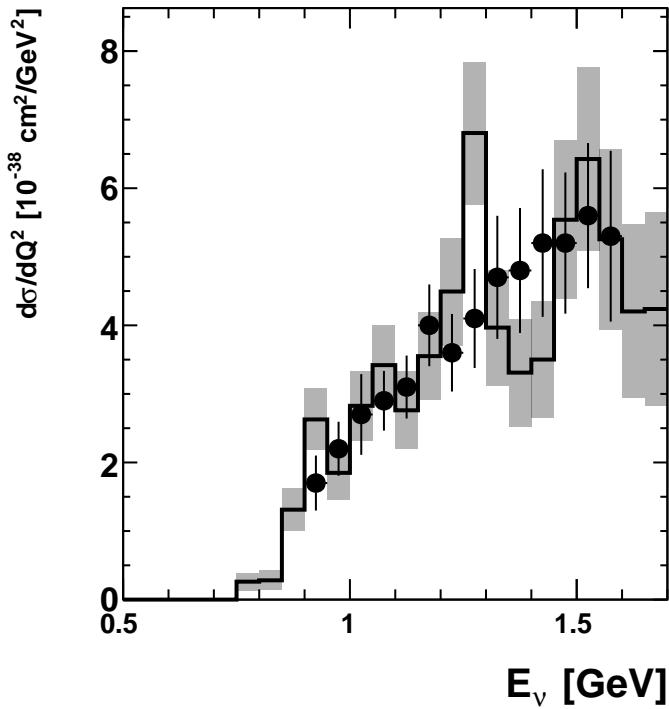
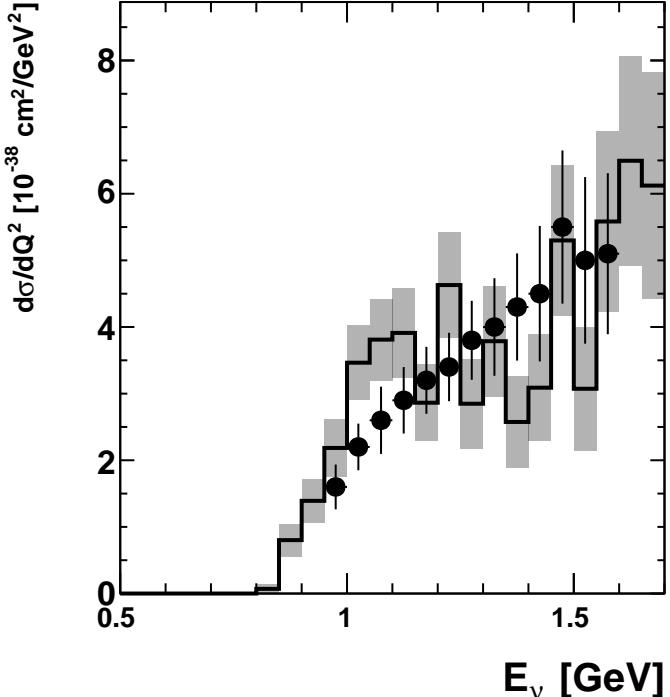
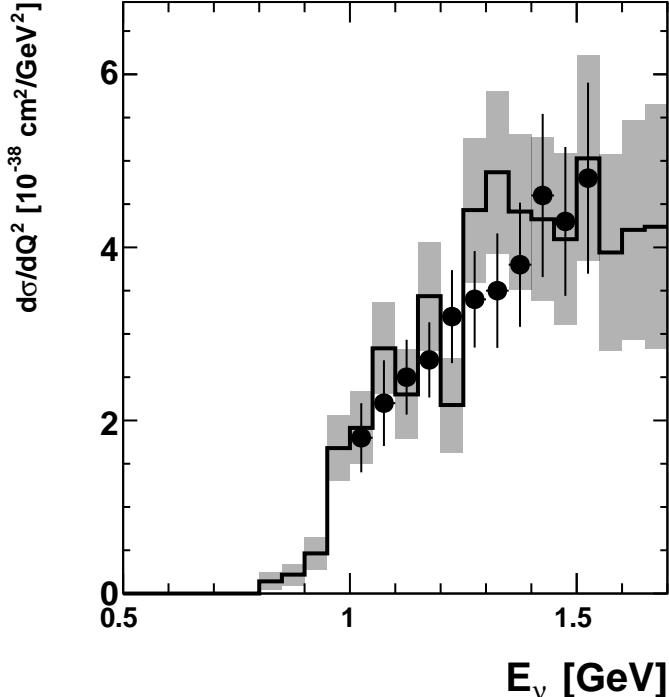
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.73/19$  DoF $Q^2 \in [0.5; 0.55] \text{ GeV}^2$ 

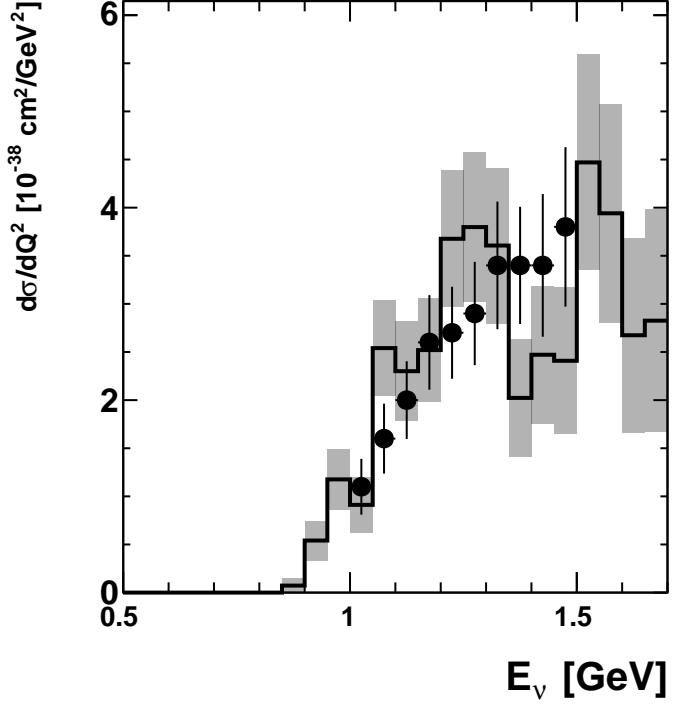
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 18.1/18$  DoF $Q^2 \in [0.55; 0.6] \text{ GeV}^2$ 

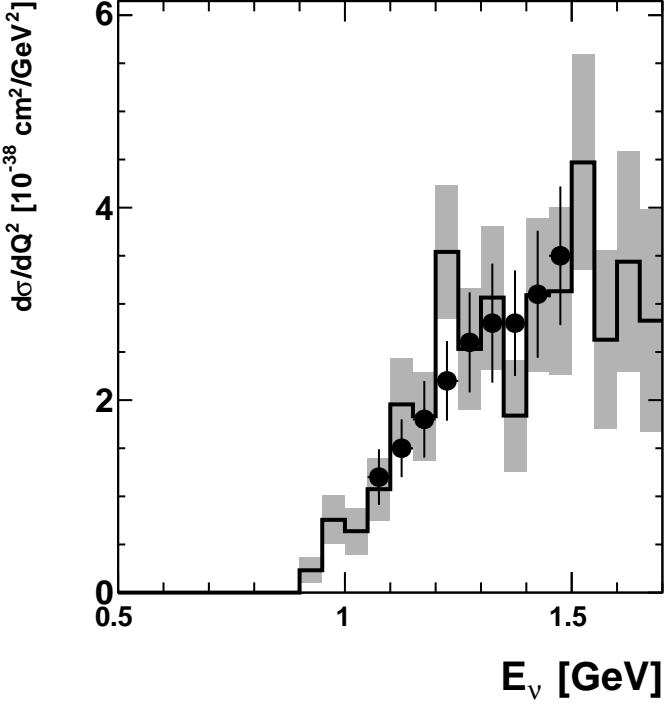
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.53/18$  DoF

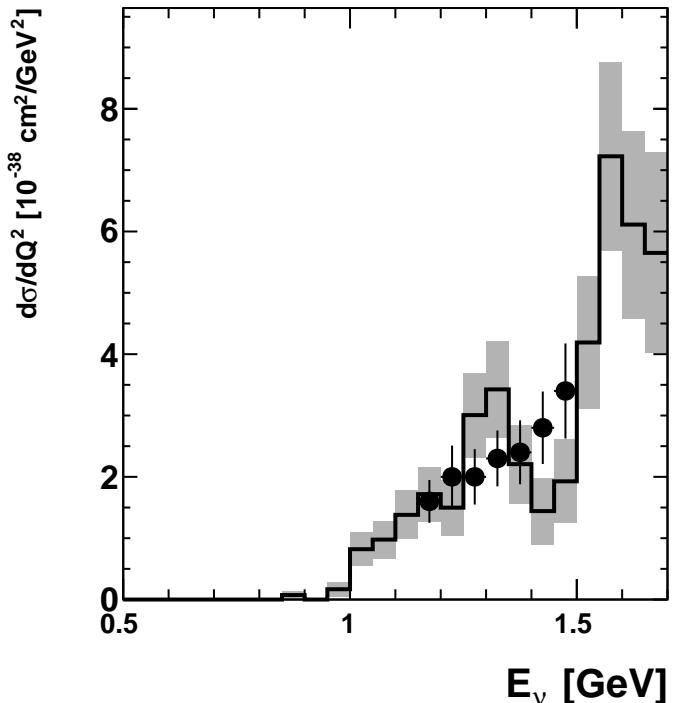
$Q^2 \in [0.6; 0.65] \text{ GeV}^2$  $Q^2 \in [0.65; 0.7] \text{ GeV}^2$  $Q^2 \in [0.7; 0.75] \text{ GeV}^2$  $Q^2 \in [0.75; 0.8] \text{ GeV}^2$ 

$Q^2 \in [0.8; 0.85] \text{ GeV}^2$  $Q^2 \in [0.85; 0.9] \text{ GeV}^2$ 

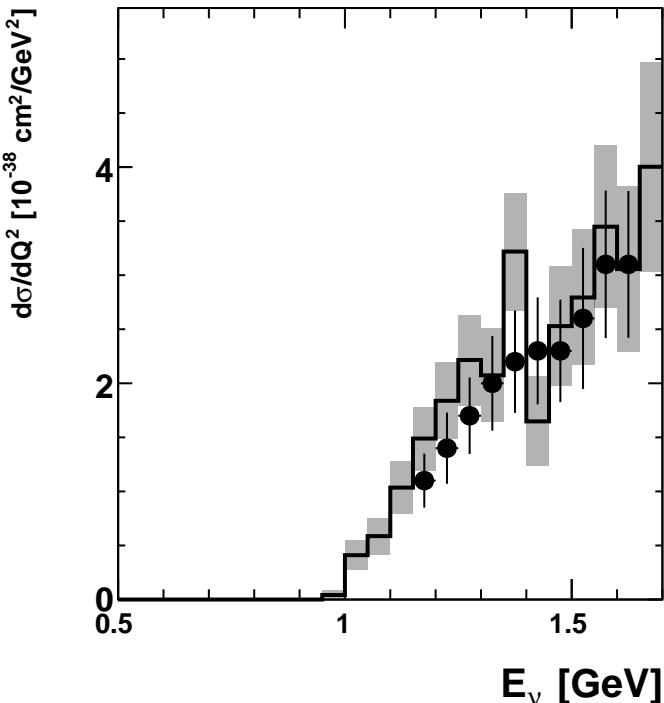
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.91/10$  DoF $E_\nu$  [GeV]

miniboone\_nucc1pip\_2011

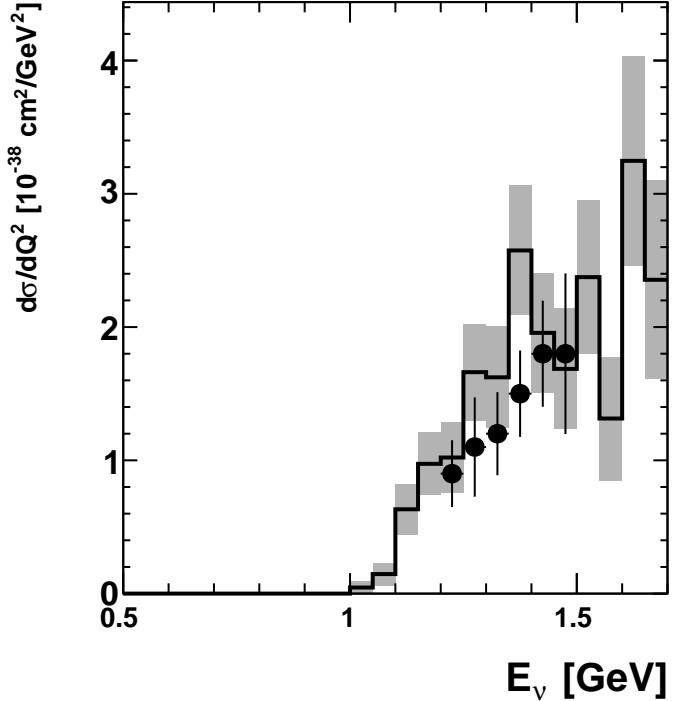
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 5.13/9$  DoF $E_\nu$  [GeV] $Q^2 \in [0.9; 0.95] \text{ GeV}^2$  $Q^2 \in [0.95; 1.05] \text{ GeV}^2$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 8.56/7$  DoF $E_\nu$  [GeV]

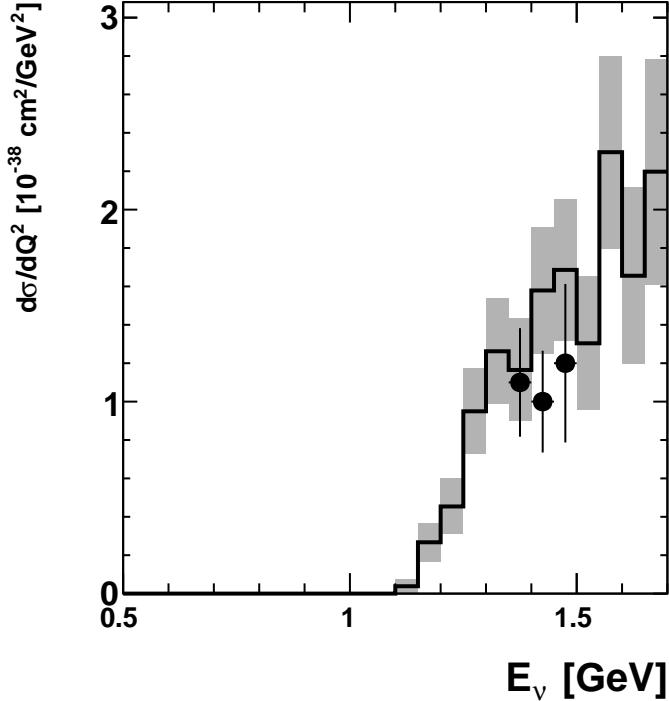
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.04/10$  DoF $E_\nu$  [GeV]

$Q^2 \in [1.05; 1.15] \text{ GeV}^2$  $Q^2 \in [1.15; 1.3] \text{ GeV}^2$ 

● miniboone\_nucc1pip\_2011

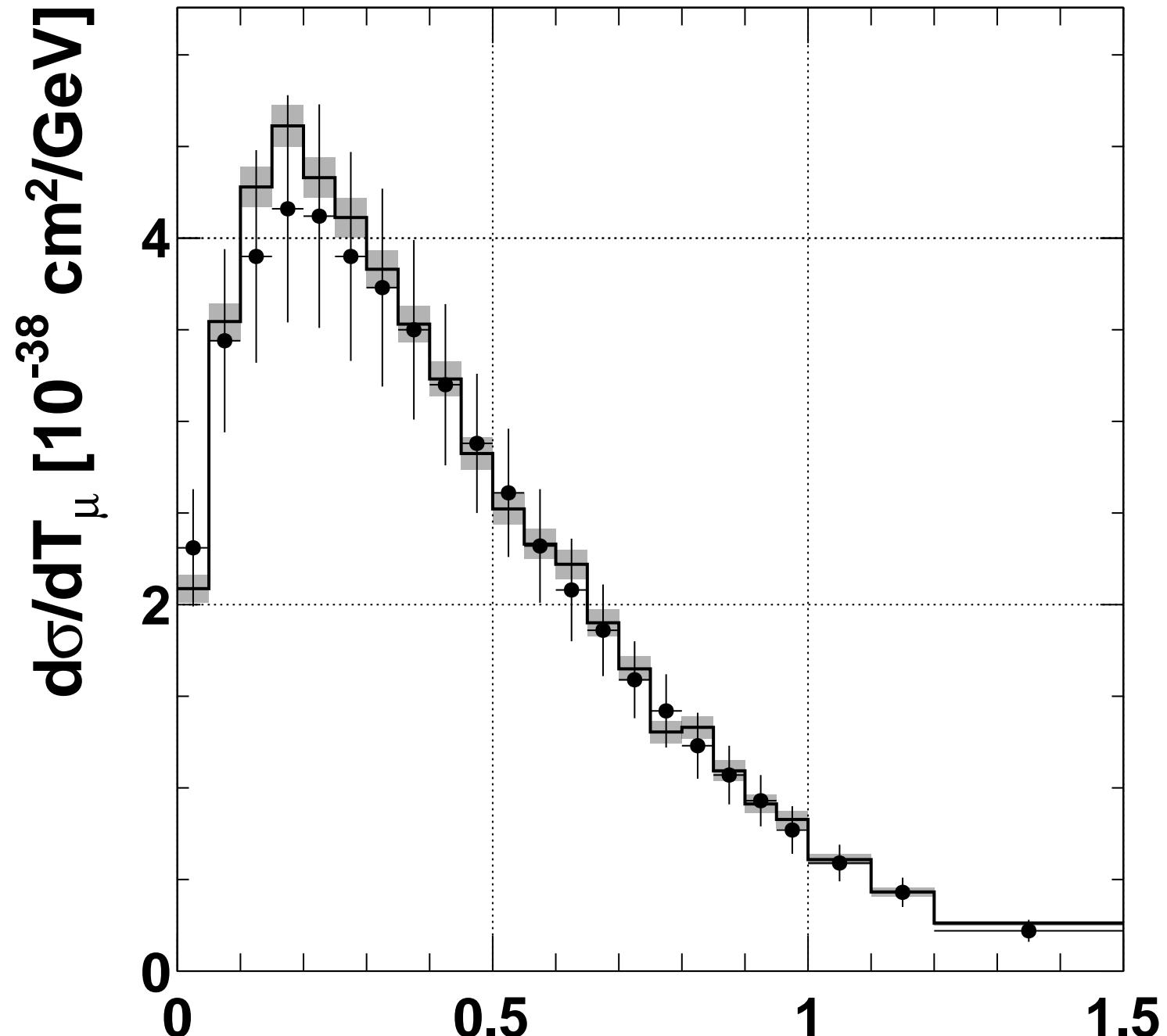
█ master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 5.48/6$  DoF



● miniboone\_nucc1pip\_2011

█ master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 2.68/3$  DoF



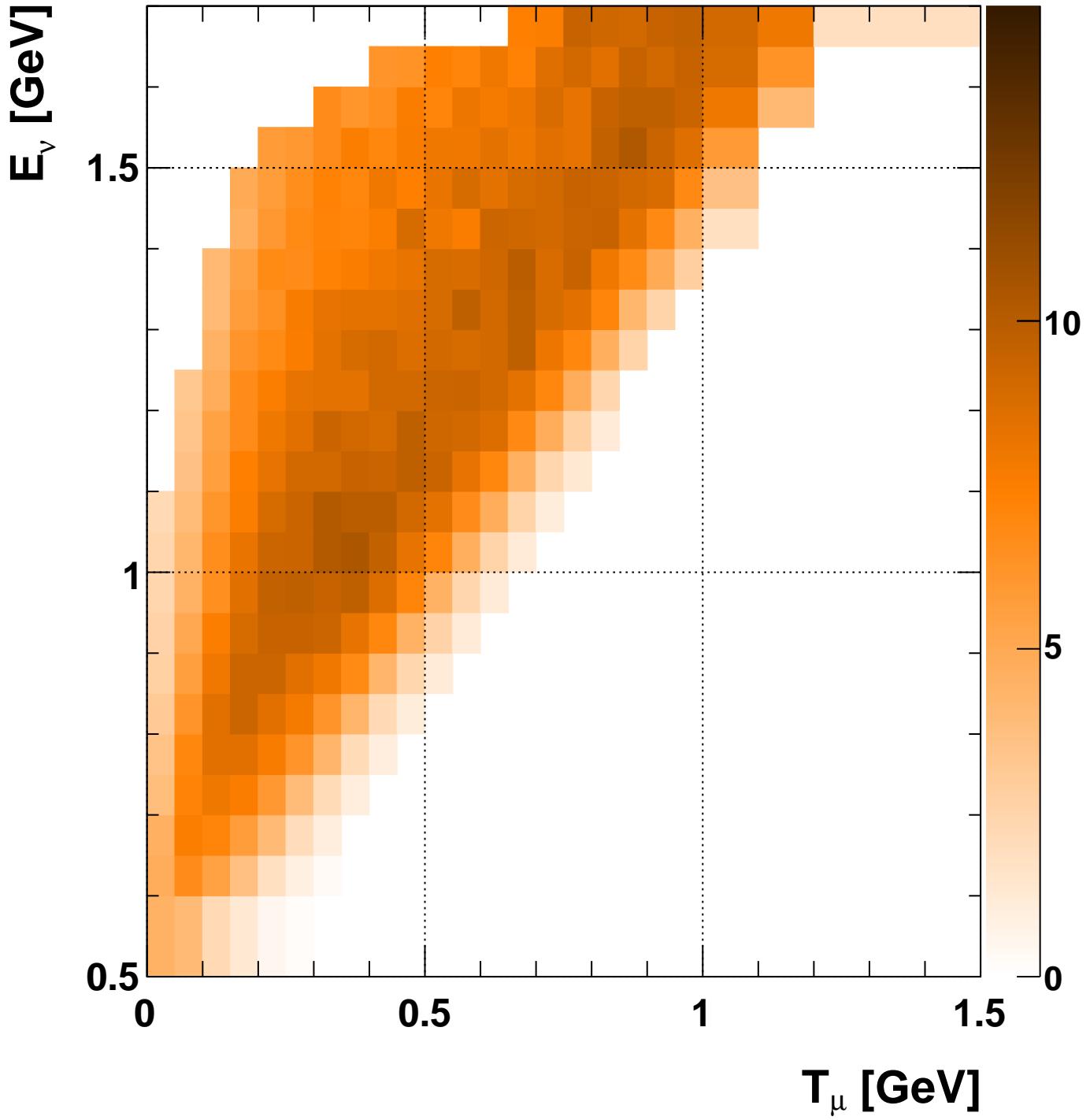


miniboone\_nucc1pip\_2011

$T_\mu$  [GeV]

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 3.42/23$  DoF

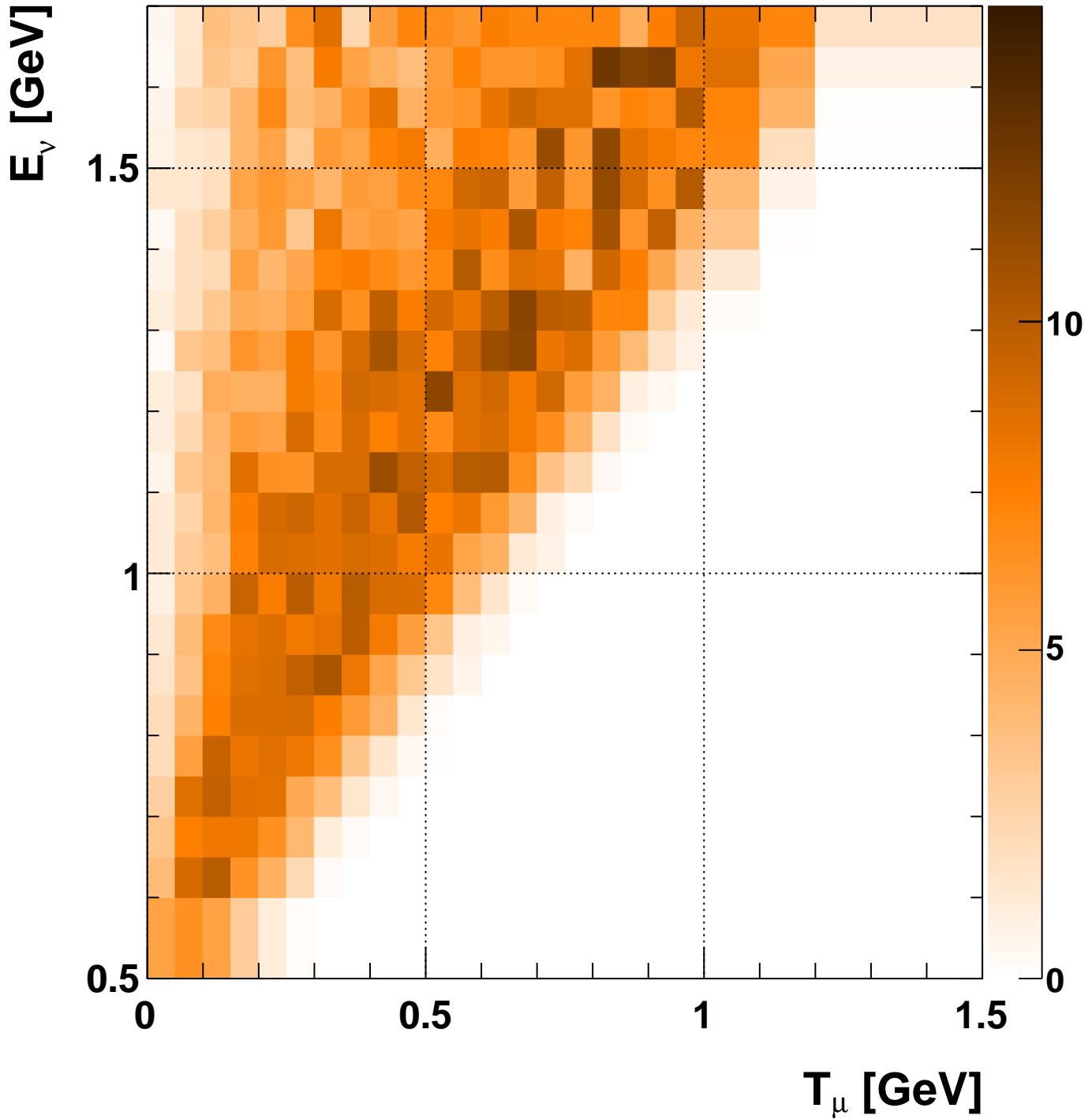
© 2003-2018, GENIE - <http://www.genie-mc.org>



$d\sigma/dT_\mu$  [ $10^{-38} \text{ cm}^2/\text{GeV}$ ]

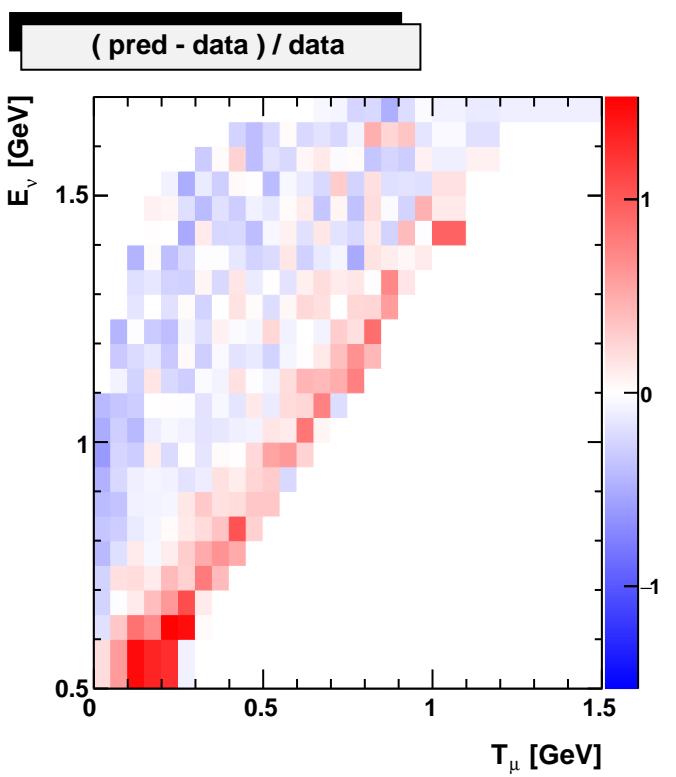
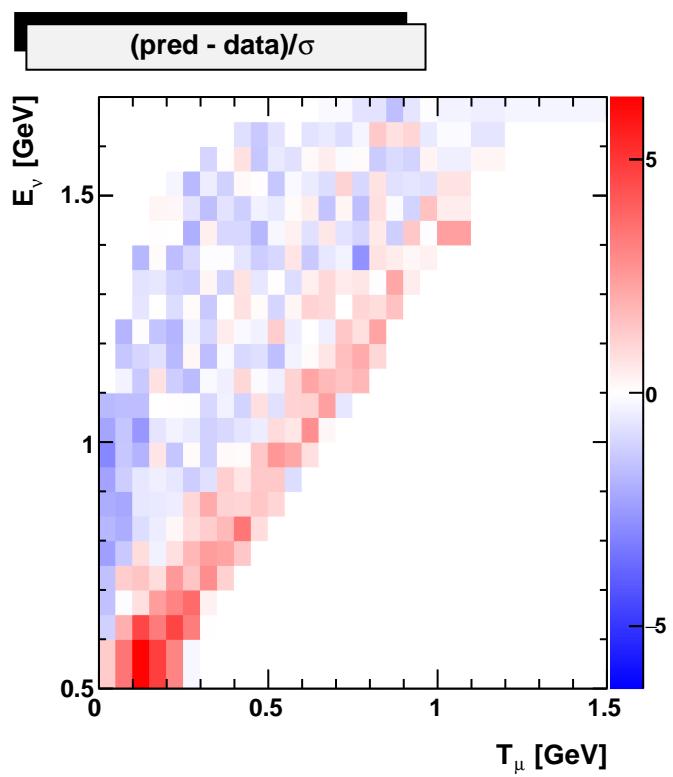
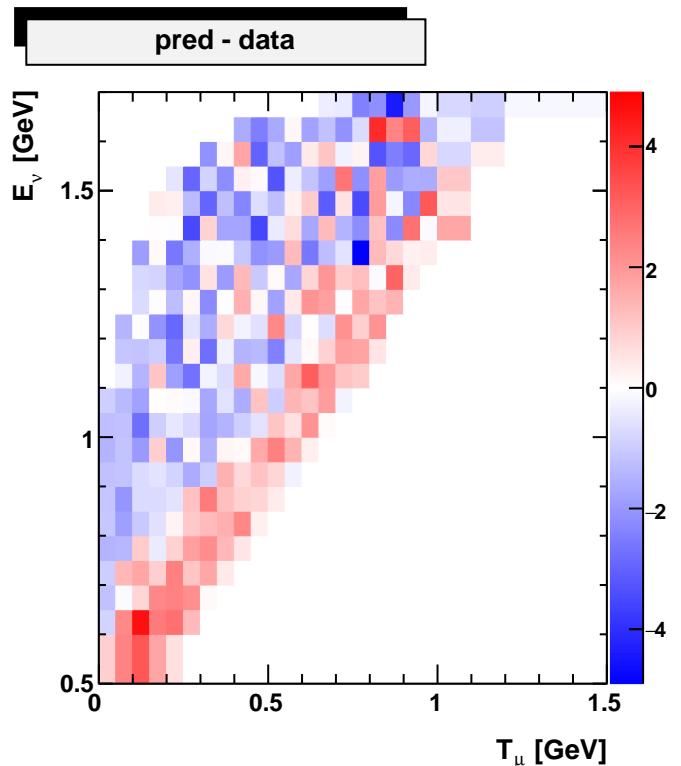
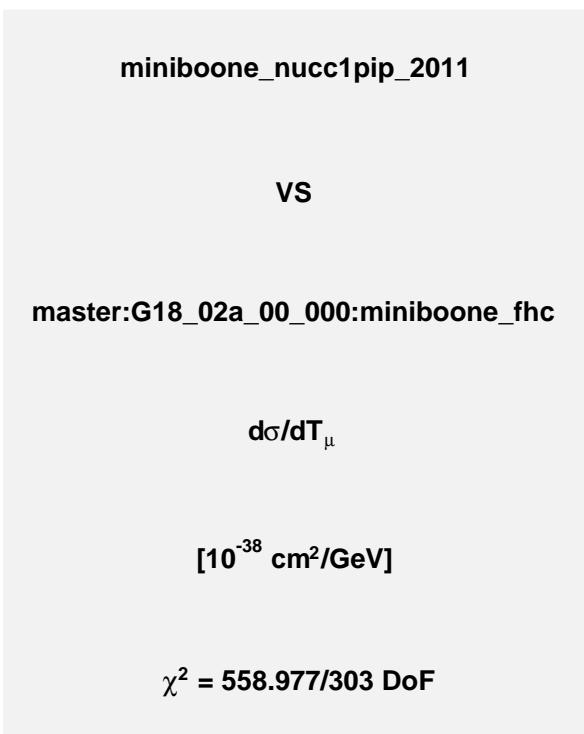
Data: miniboone\_nucc1pip\_2011

© 2003-2018, GENIE - <http://www.genie-mc.org>

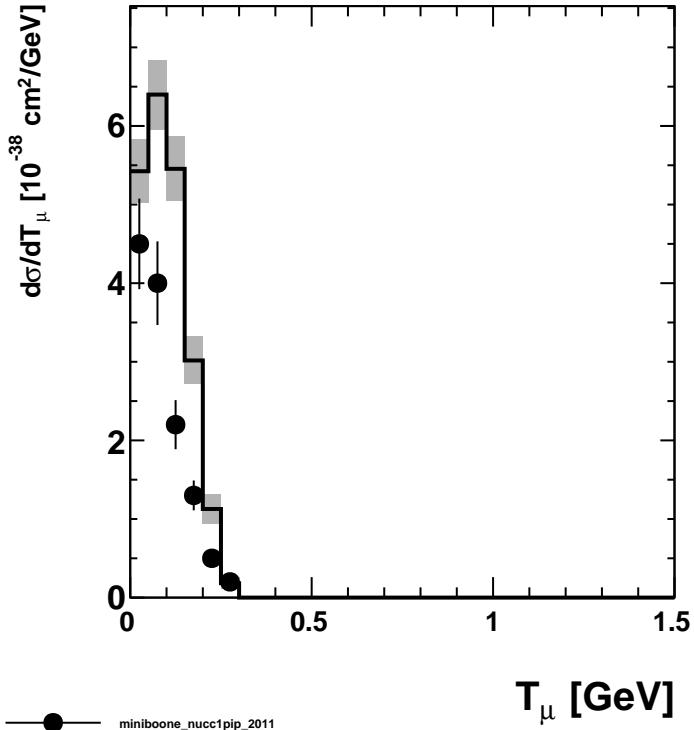
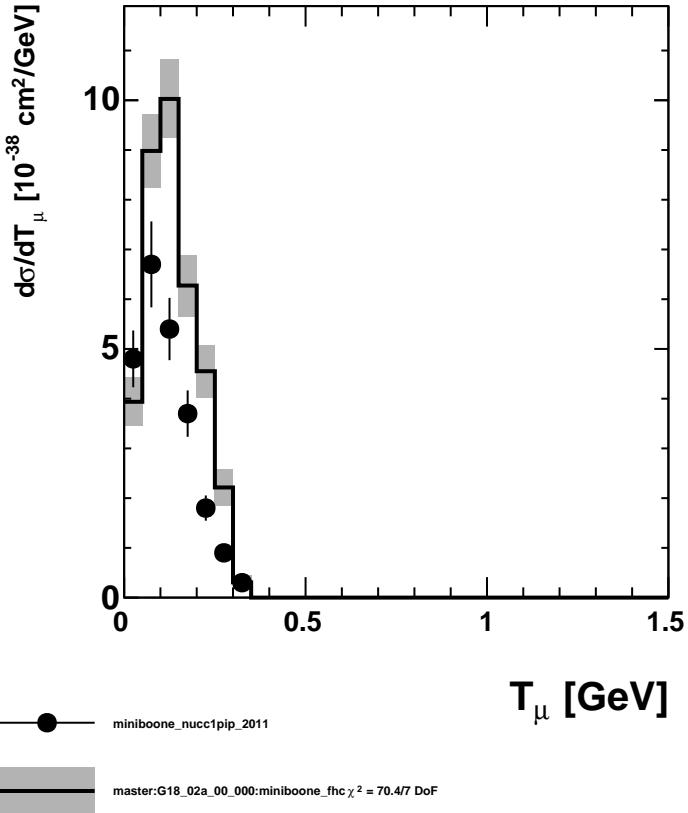
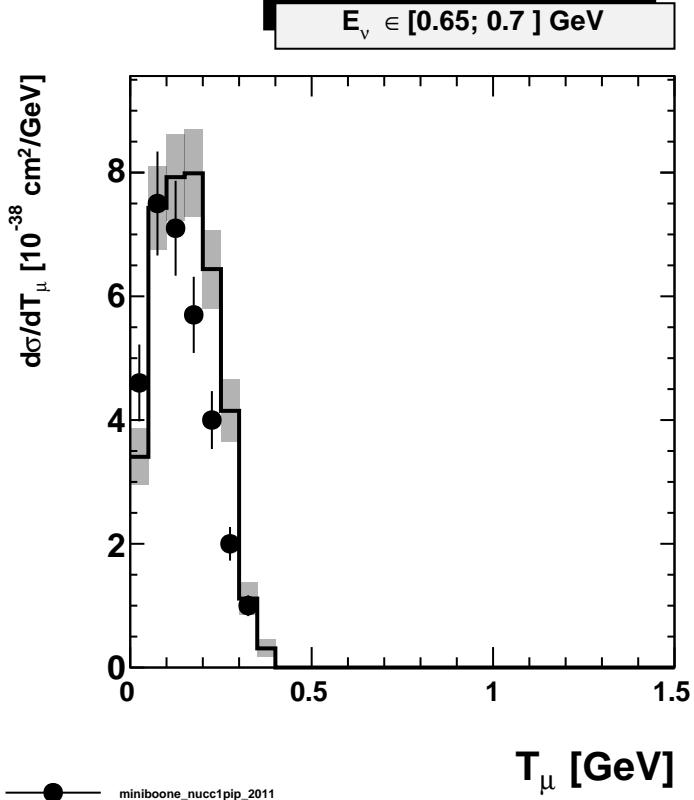
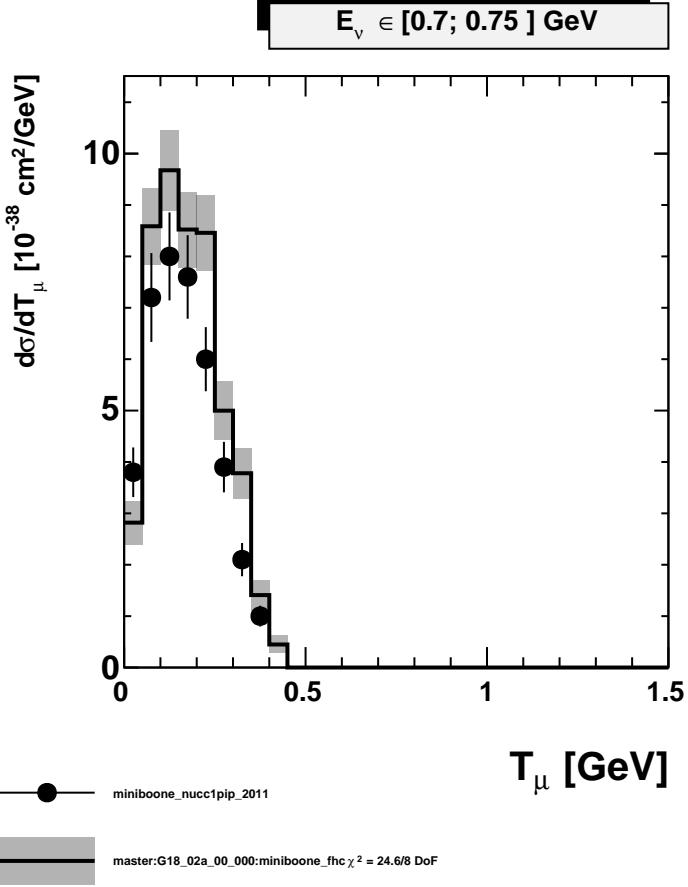


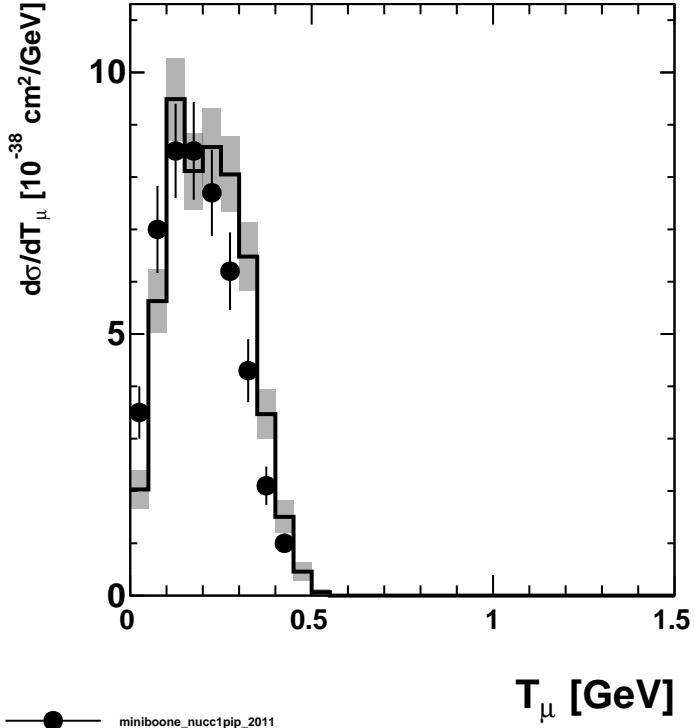
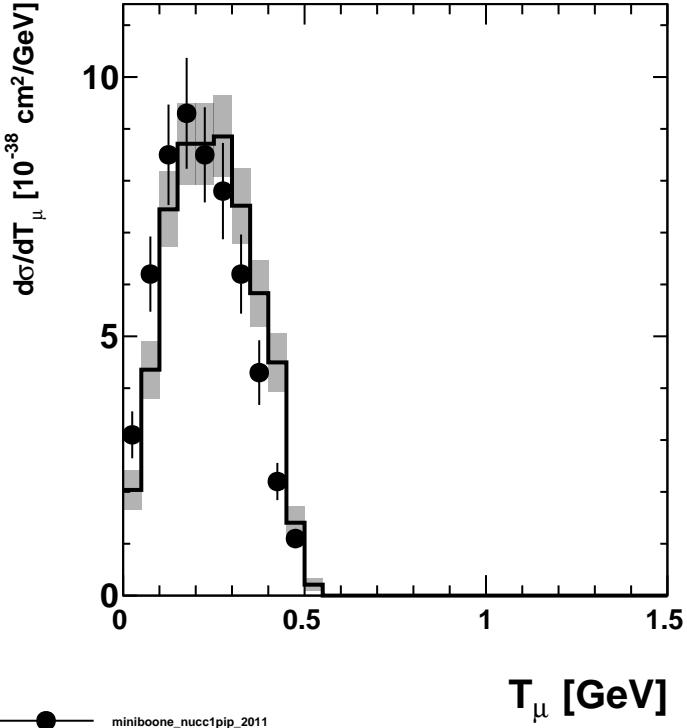
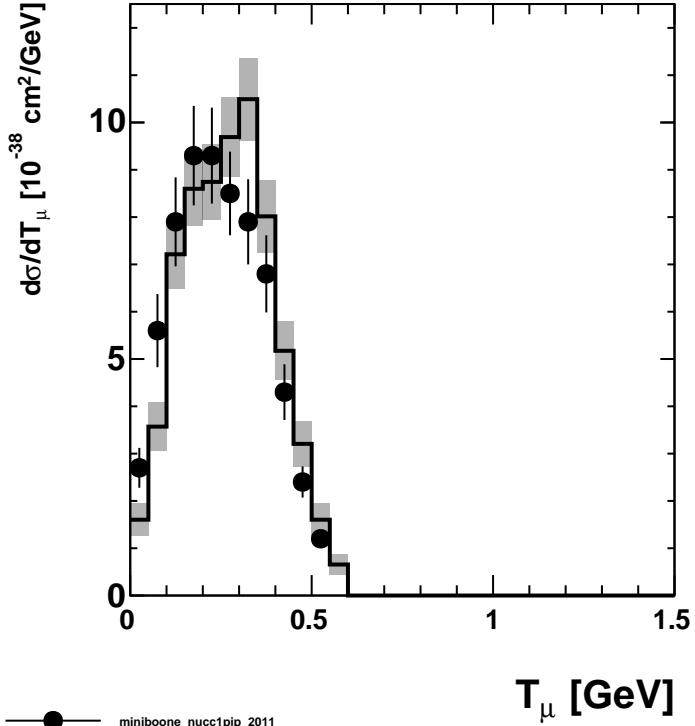
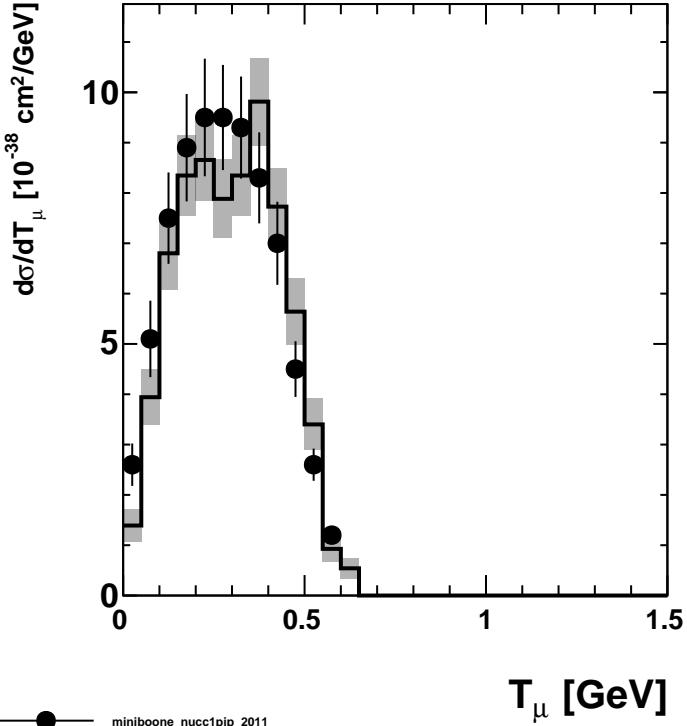
$d\sigma/dT_\mu$  [ $10^{-38}$  cm $^2$ /GeV]

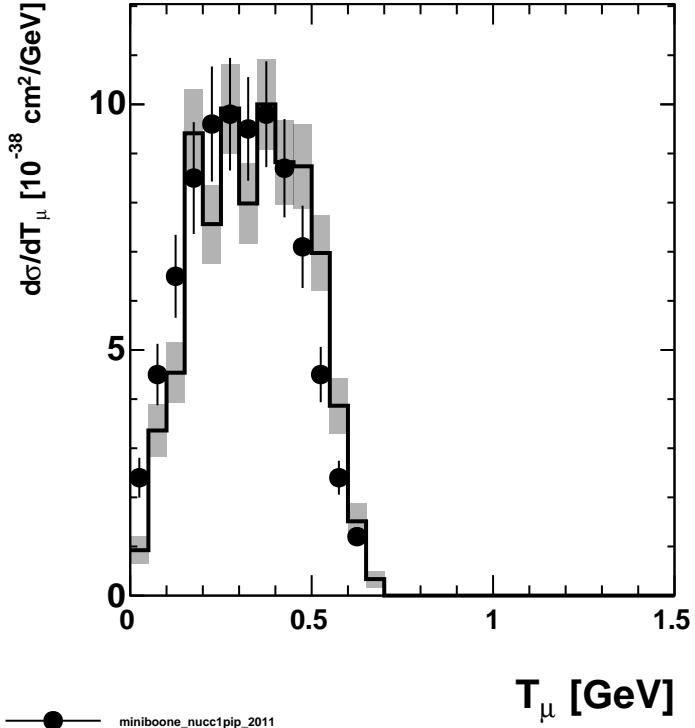
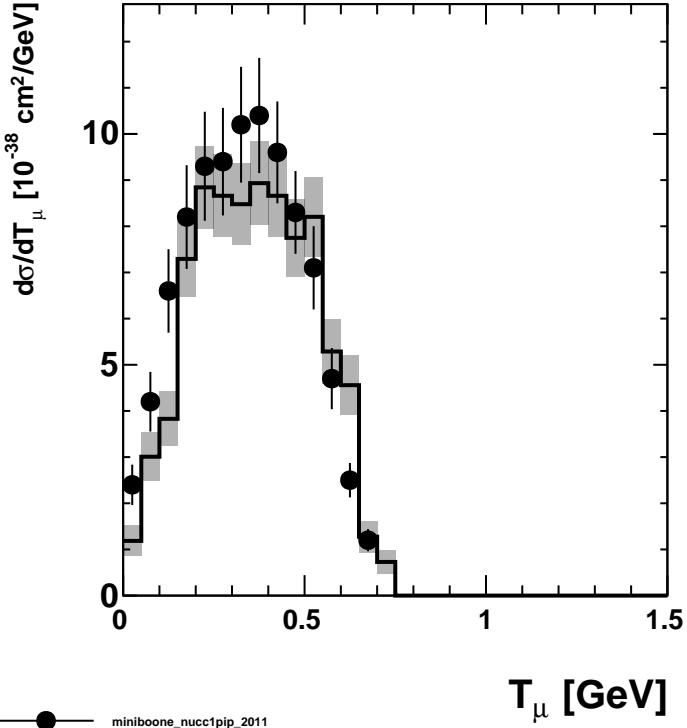
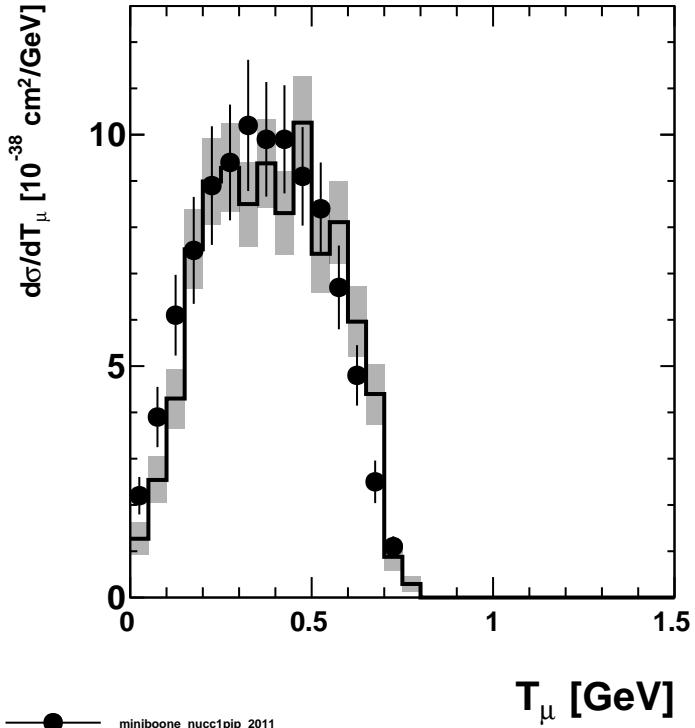
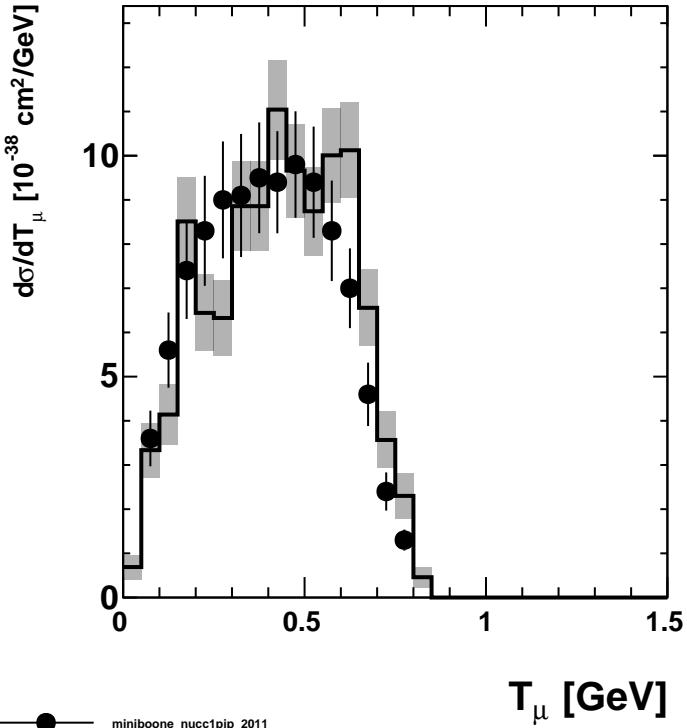
Pred: master:G18\_02a\_00\_000:miniboone\_fhc

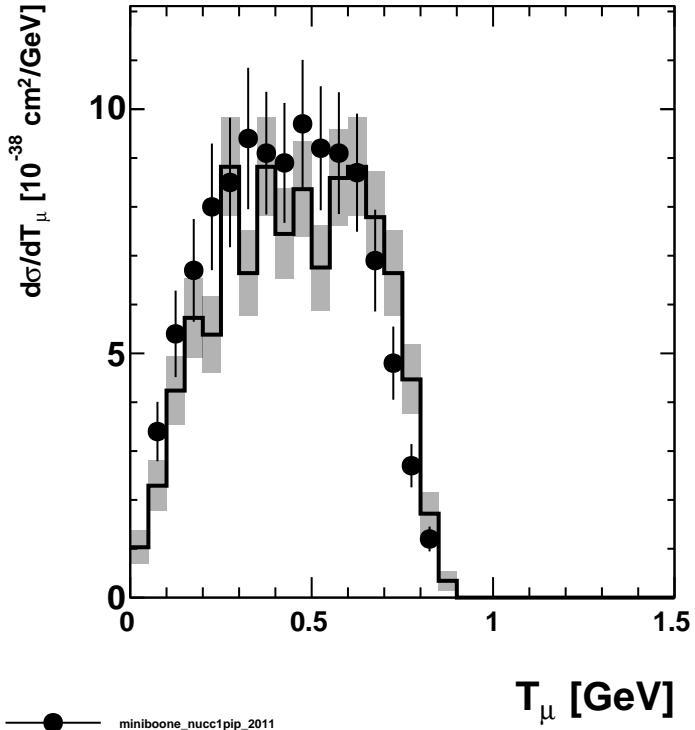
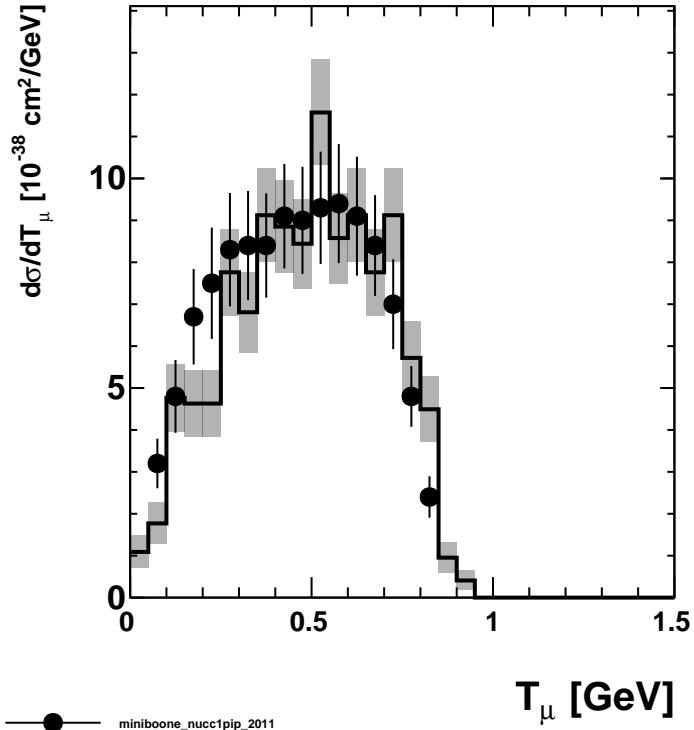
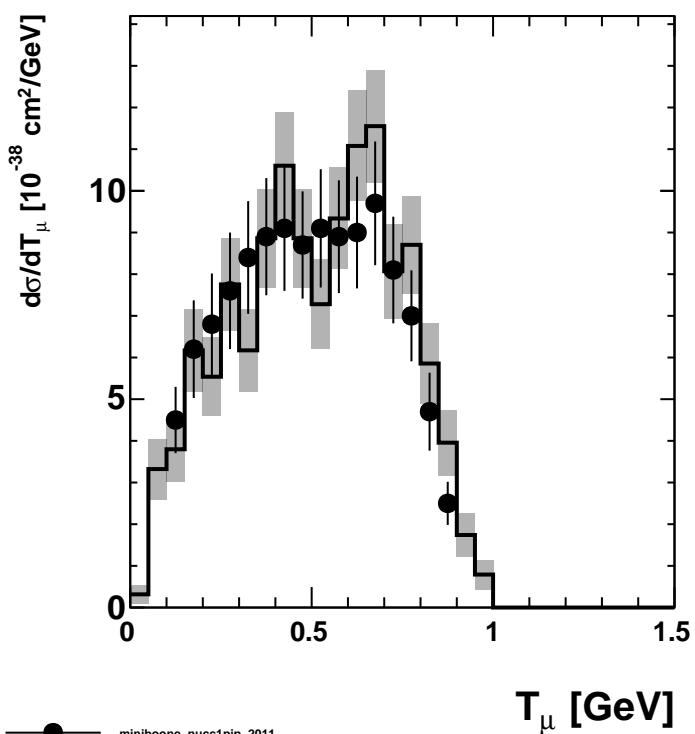
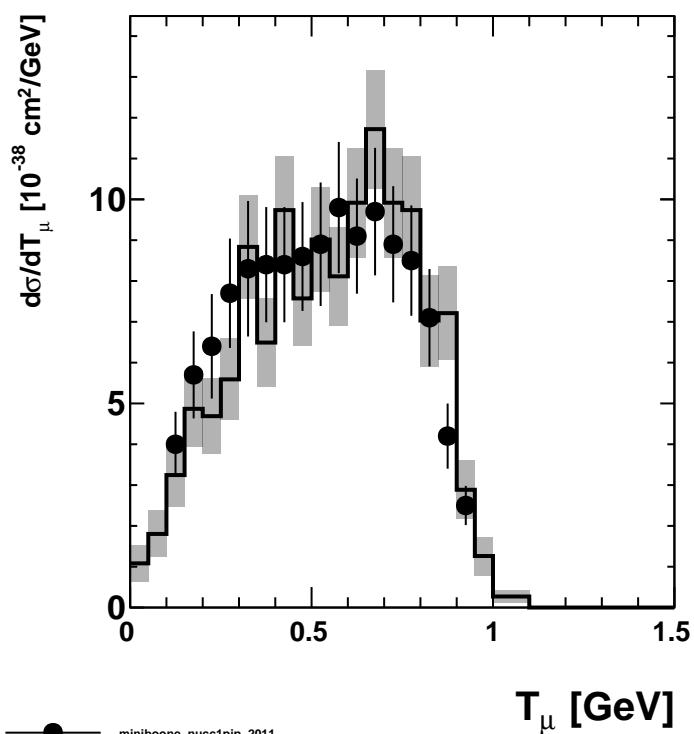


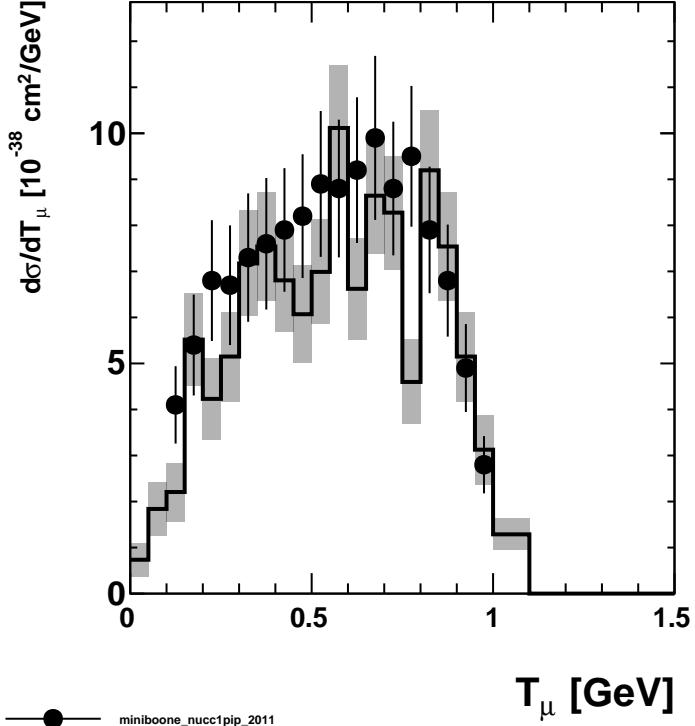
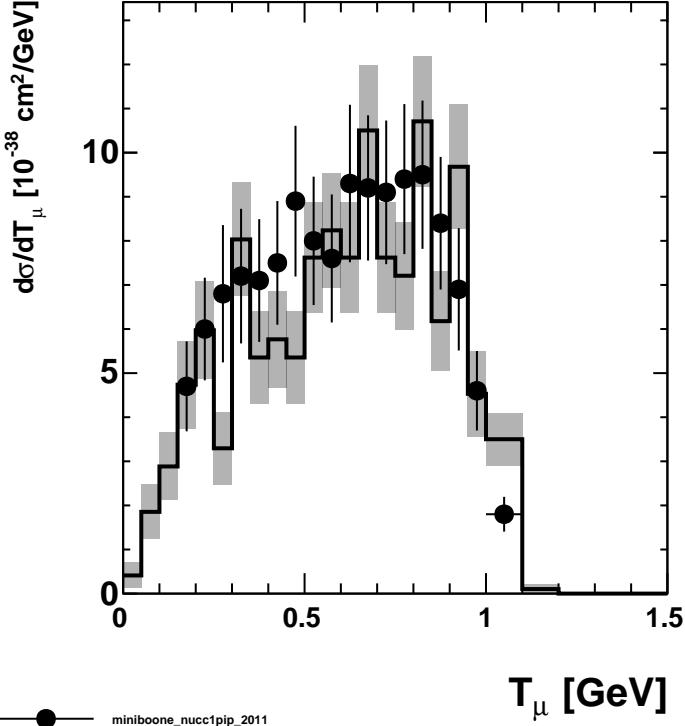
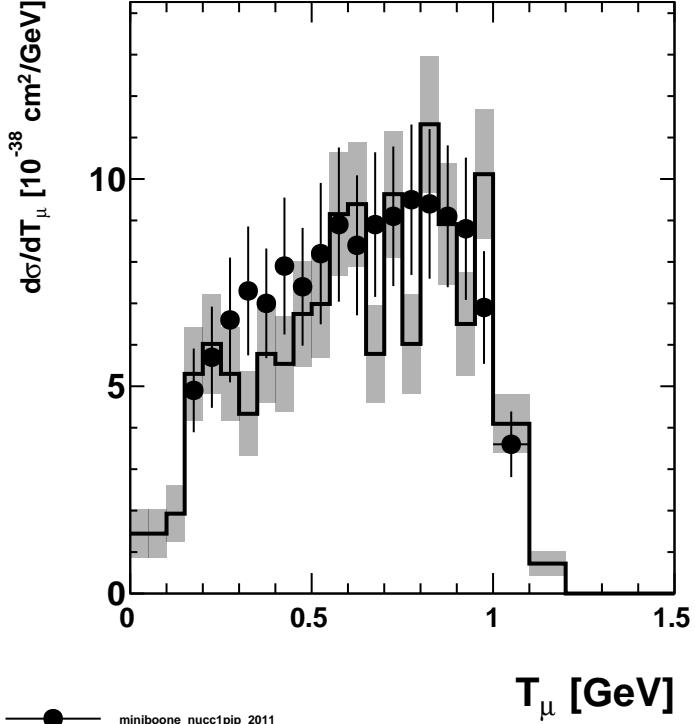
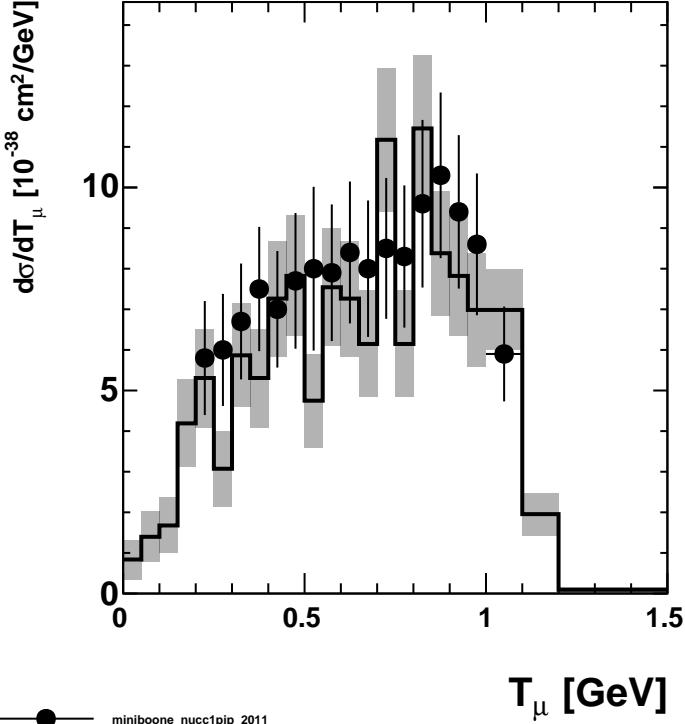


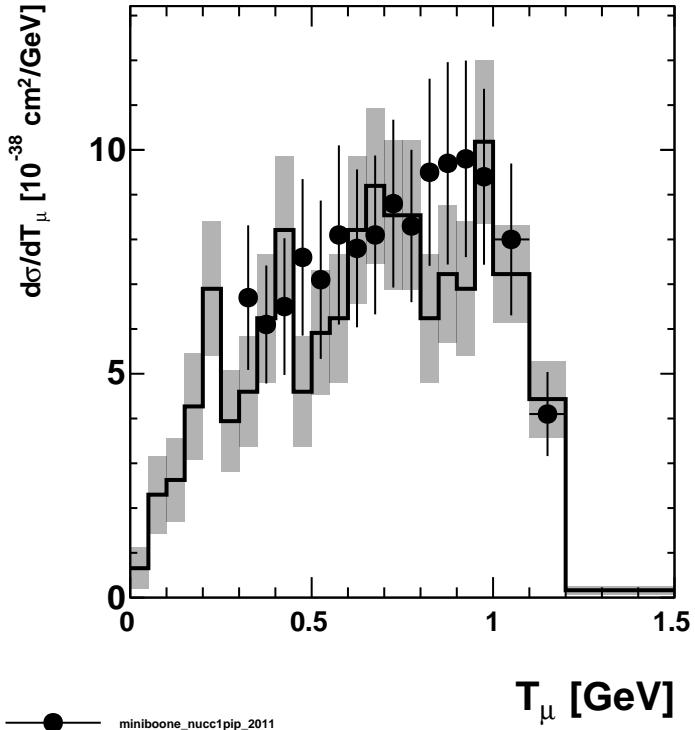
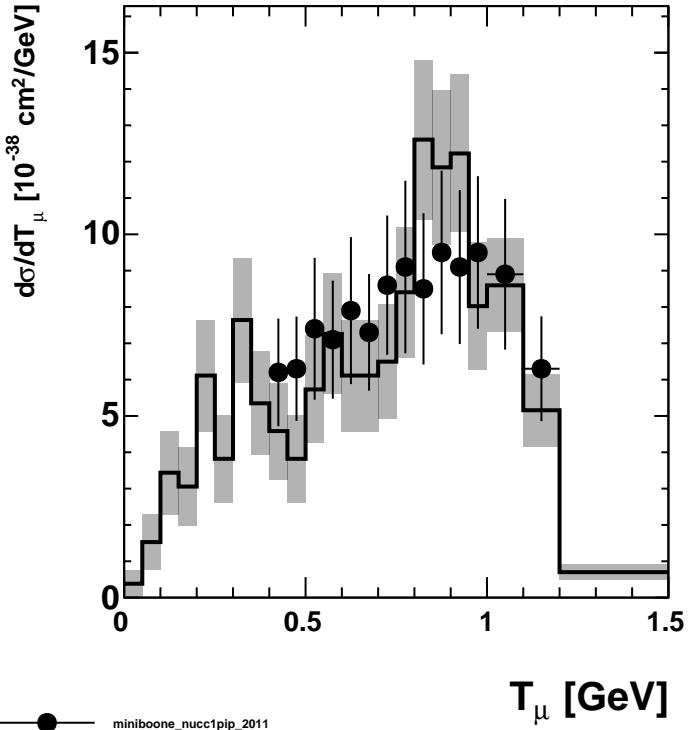
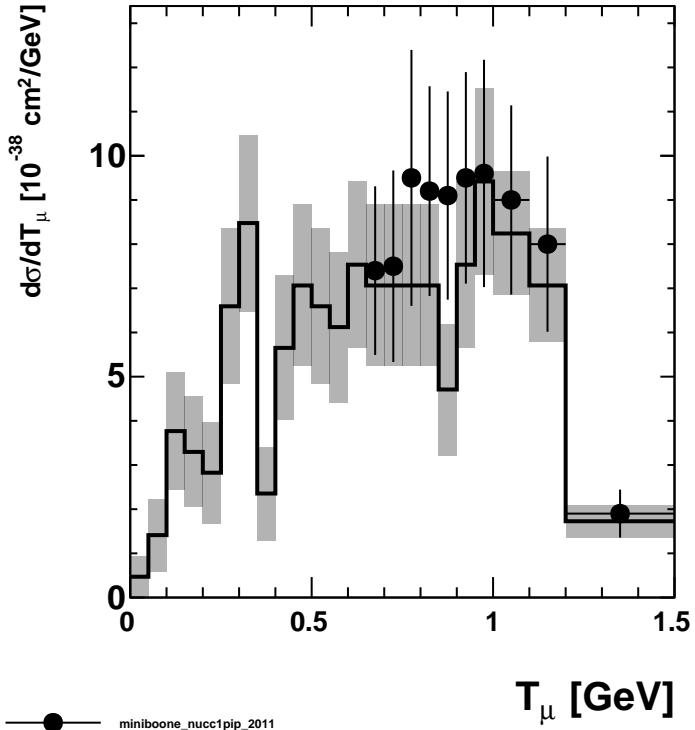
$E_\nu \in [0.5; 0.6] \text{ GeV}$  $E_\nu \in [0.6; 0.65] \text{ GeV}$  $E_\nu \in [0.65; 0.7] \text{ GeV}$  $E_\nu \in [0.7; 0.75] \text{ GeV}$ 

$E_\nu \in [0.75; 0.8] \text{ GeV}$  $E_\nu \in [0.8; 0.85] \text{ GeV}$  $E_\nu \in [0.85; 0.9] \text{ GeV}$  $E_\nu \in [0.9; 0.95] \text{ GeV}$ 

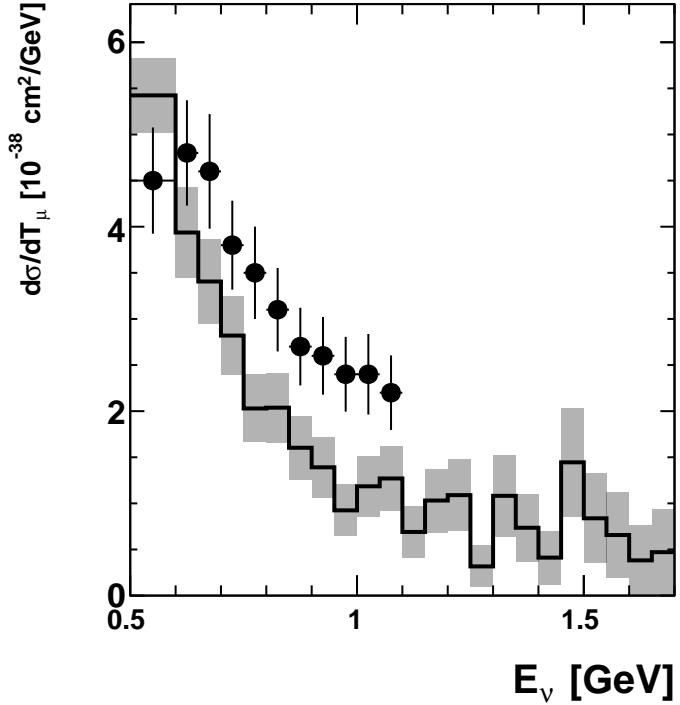
$E_\nu \in [0.95; 1] \text{ GeV}$  $E_\nu \in [1; 1.05] \text{ GeV}$  $E_\nu \in [1.05; 1.1] \text{ GeV}$  $E_\nu \in [1.1; 1.15] \text{ GeV}$ 

$E_\nu \in [1.15; 1.2] \text{ GeV}$  $E_\nu \in [1.2; 1.25] \text{ GeV}$  $E_\nu \in [1.25; 1.3] \text{ GeV}$  $E_\nu \in [1.3; 1.35] \text{ GeV}$ 

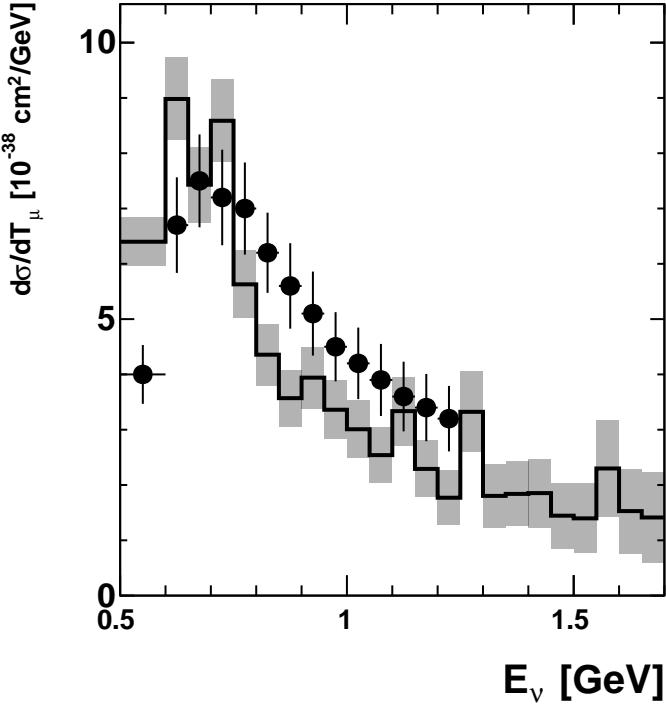
$E_\nu \in [1.35; 1.4] \text{ GeV}$  $E_\nu \in [1.4; 1.45] \text{ GeV}$  $E_\nu \in [1.45; 1.5] \text{ GeV}$  $E_\nu \in [1.5; 1.55] \text{ GeV}$ 

$E_\nu \in [1.55; 1.6] \text{ GeV}$  $E_\nu \in [1.6; 1.65] \text{ GeV}$  $E_\nu \in [1.65; 1.7] \text{ GeV}$ 

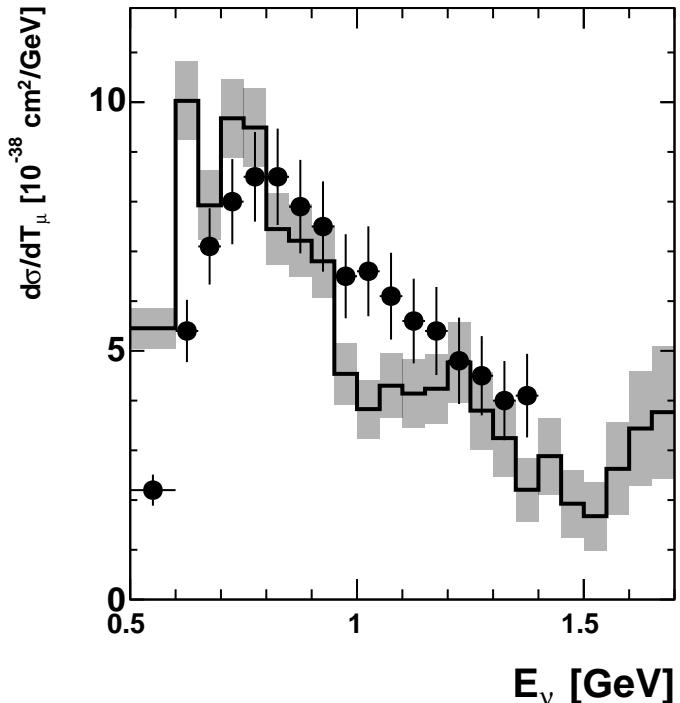


$T_\mu \in [0; 0.05] \text{ GeV}$ 

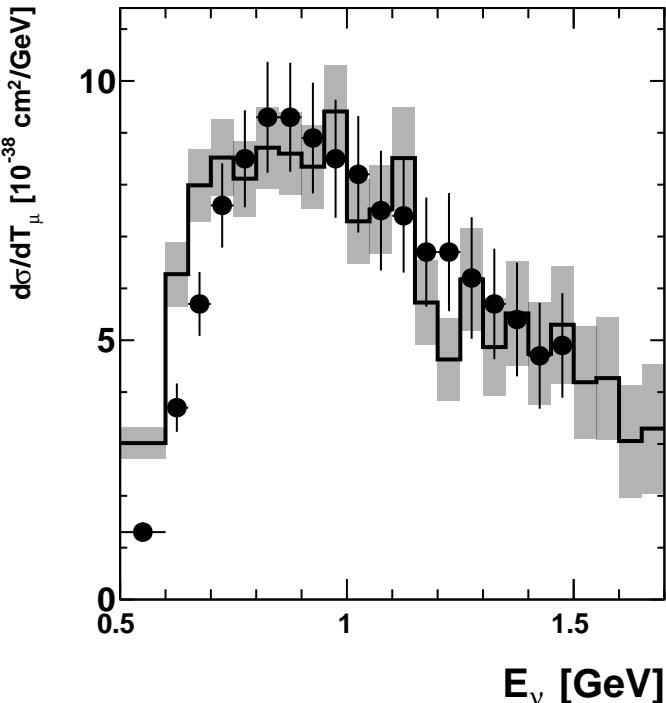
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 42.8/11$  DoF $T_\mu \in [0.05; 0.1] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

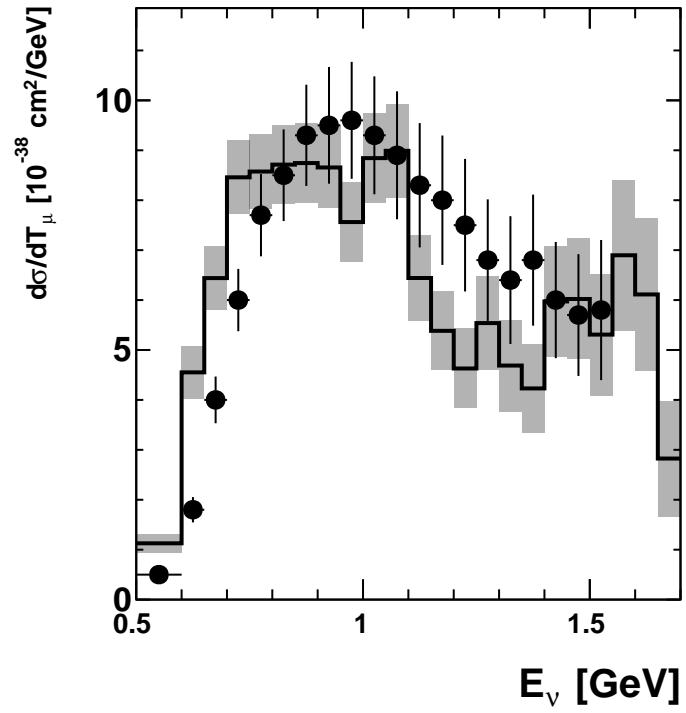
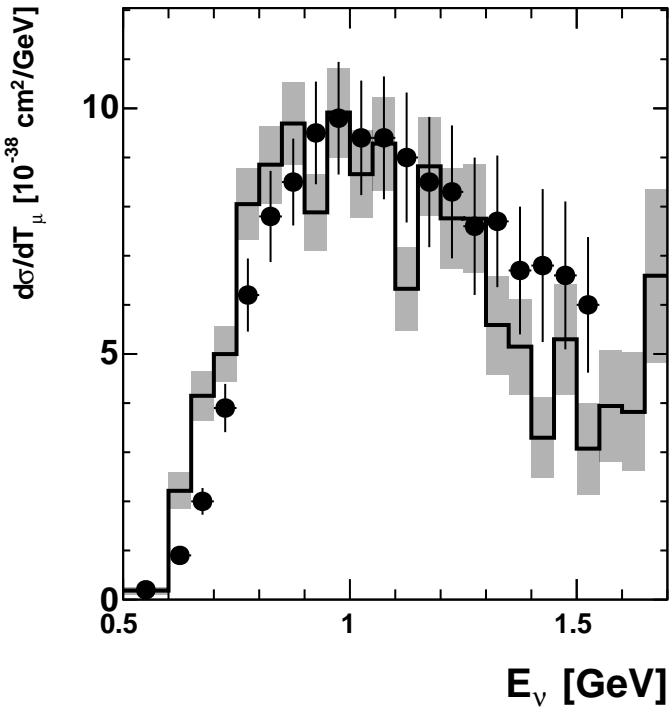
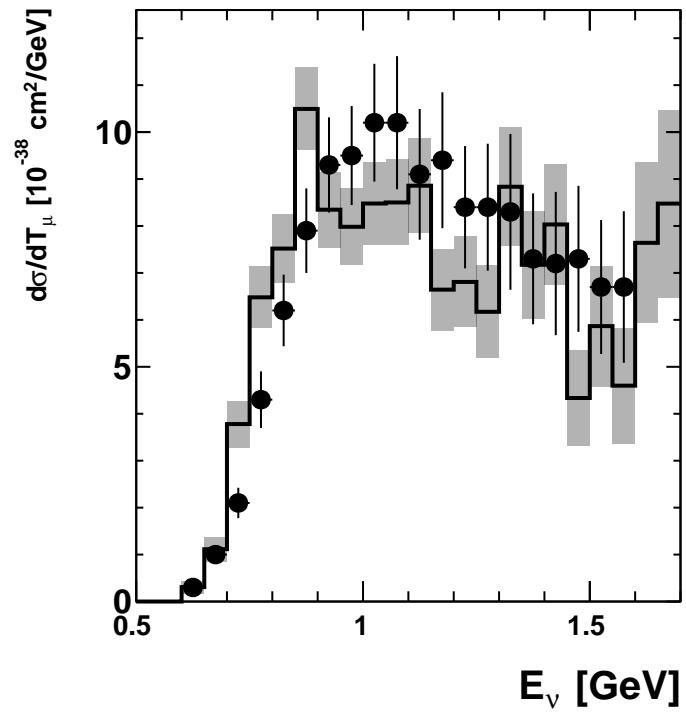
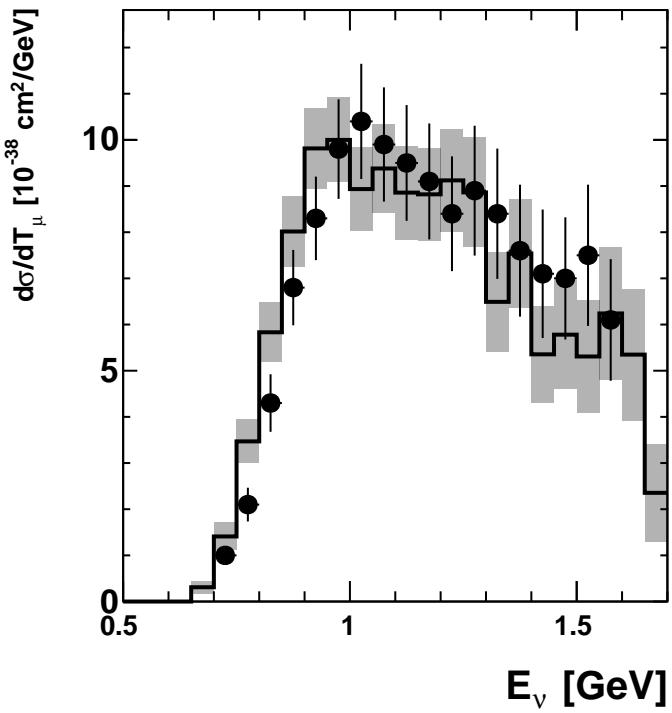
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 41.9/14$  DoF $T_\mu \in [0.1; 0.15] \text{ GeV}$ 

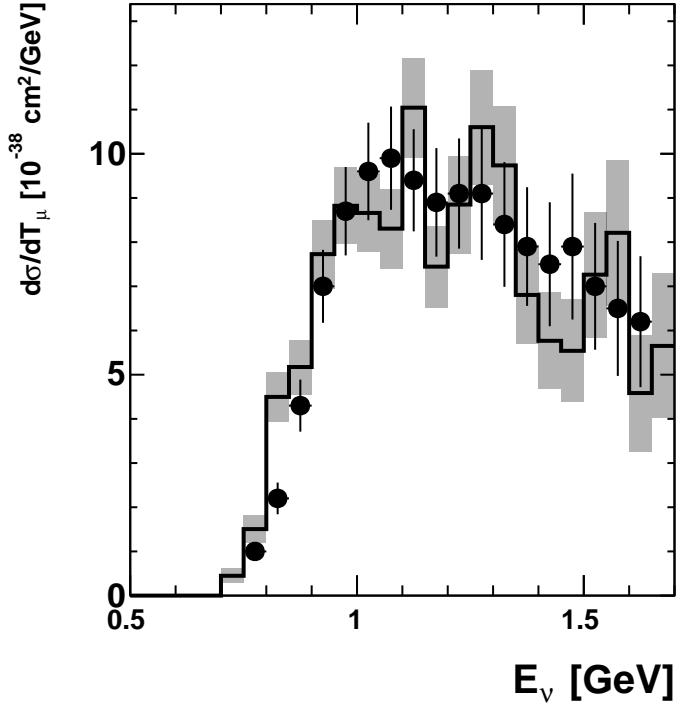
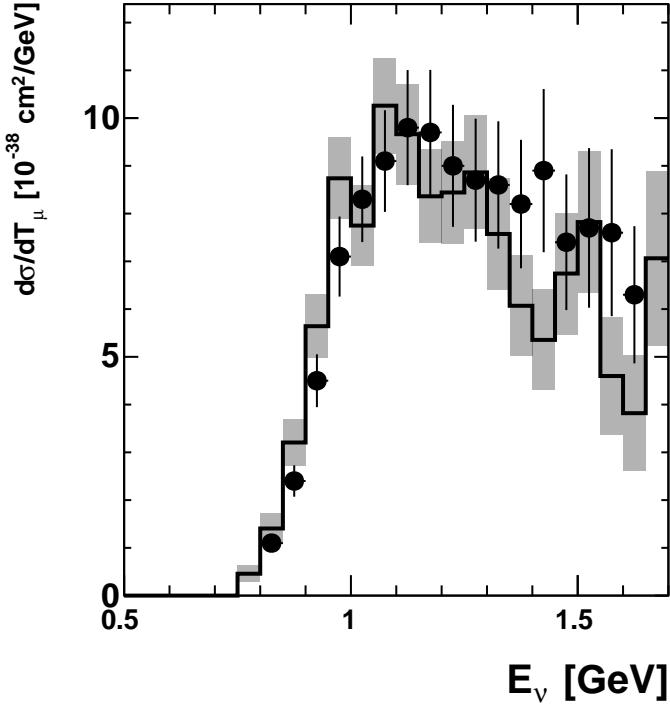
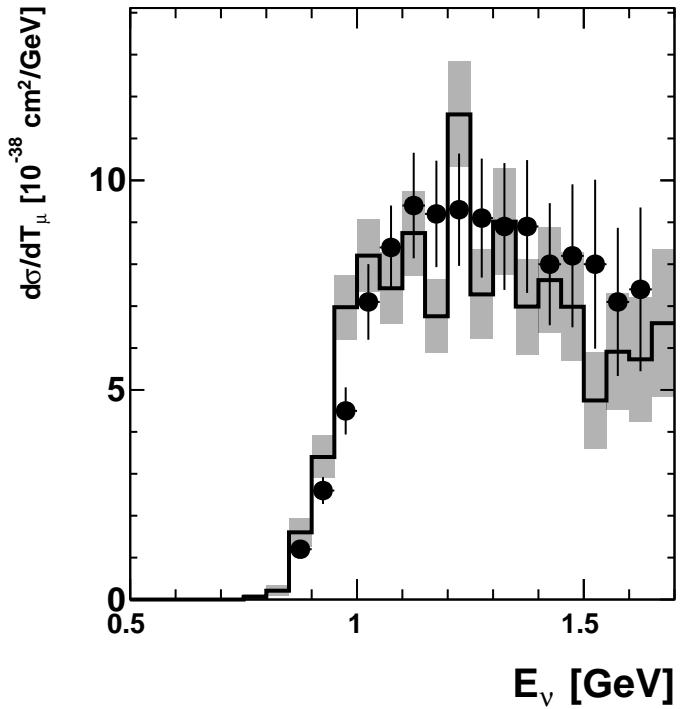
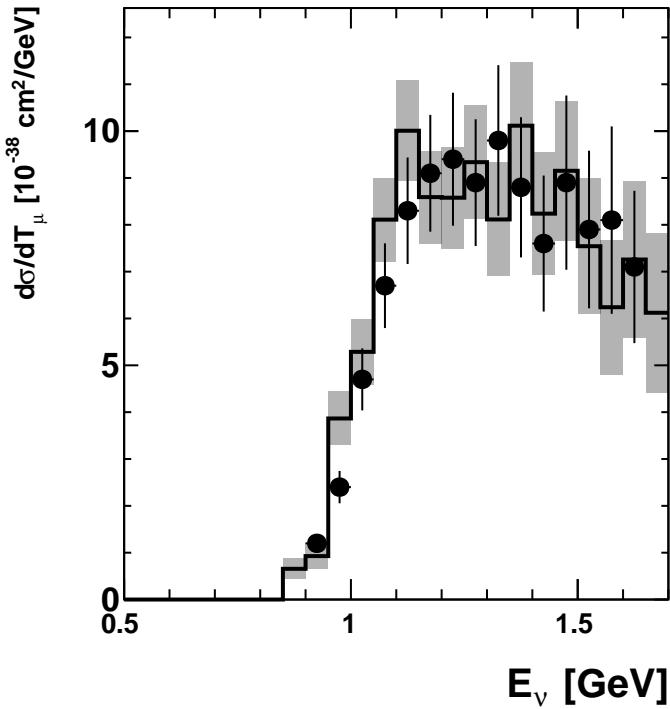
miniboone\_nucc1pip\_2011

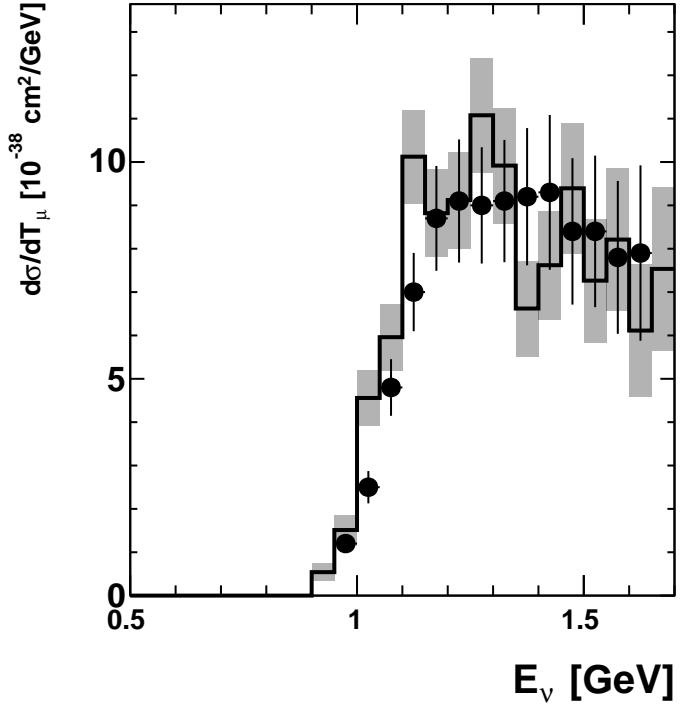
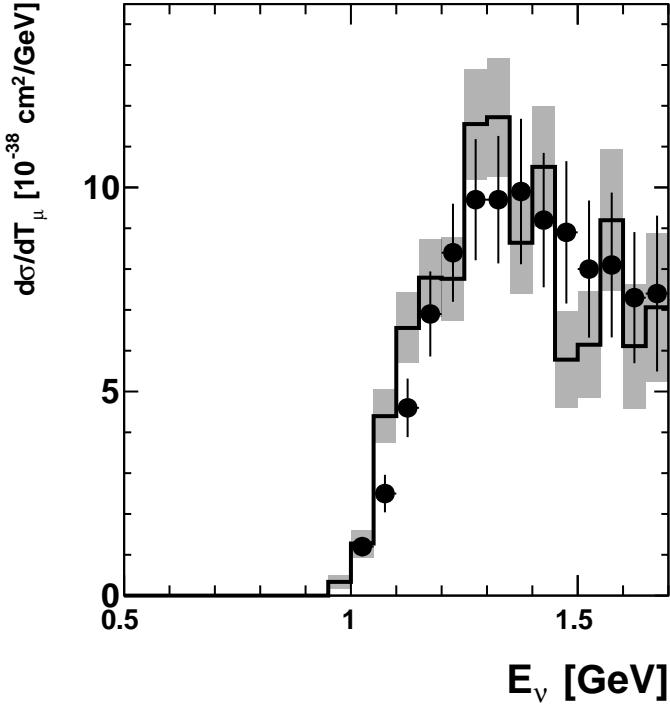
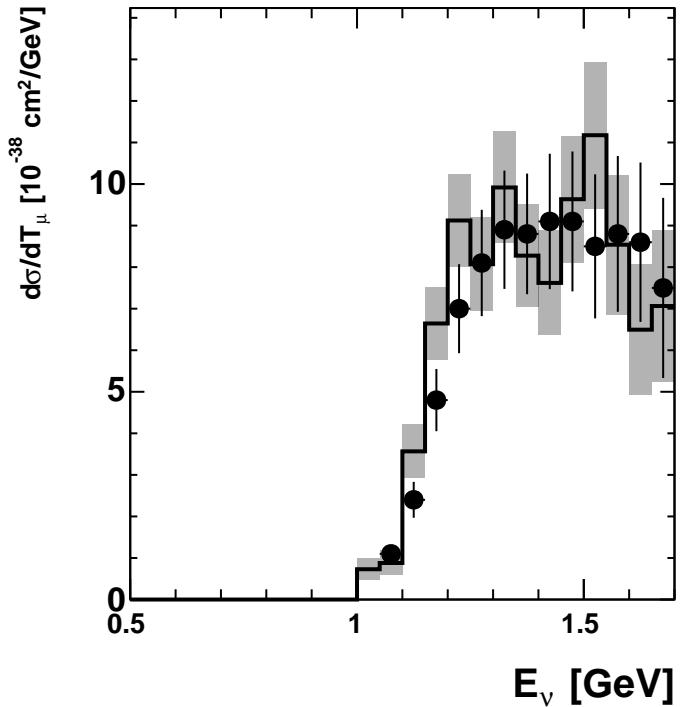
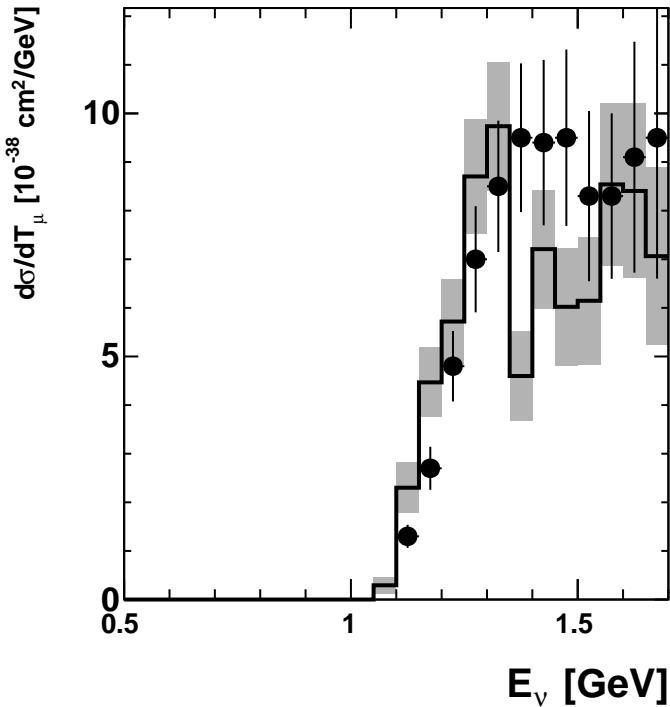
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 86/17$  DoF $T_\mu \in [0.15; 0.2] \text{ GeV}$ 

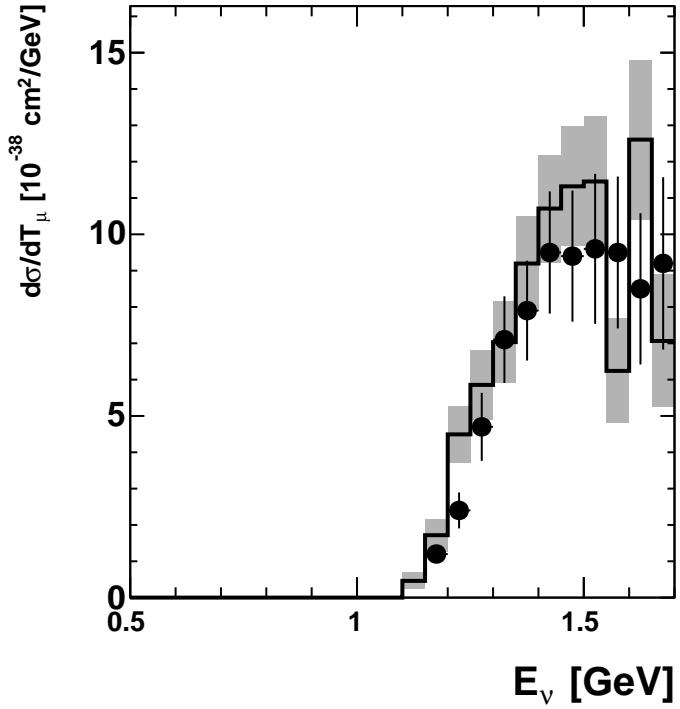
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 46/19$  DoF

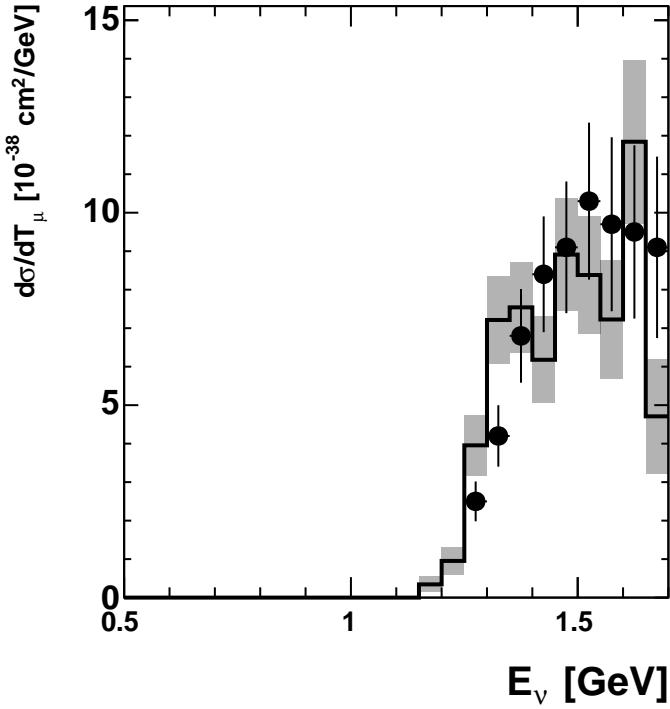
$T_\mu \in [0.2; 0.25] \text{ GeV}$  $T_\mu \in [0.25; 0.3] \text{ GeV}$  $T_\mu \in [0.3; 0.35] \text{ GeV}$  $T_\mu \in [0.35; 0.4] \text{ GeV}$ 

$T_\mu \in [0.4; 0.45] \text{ GeV}$  $T_\mu \in [0.45; 0.5] \text{ GeV}$  $T_\mu \in [0.5; 0.55] \text{ GeV}$  $T_\mu \in [0.55; 0.6] \text{ GeV}$ 

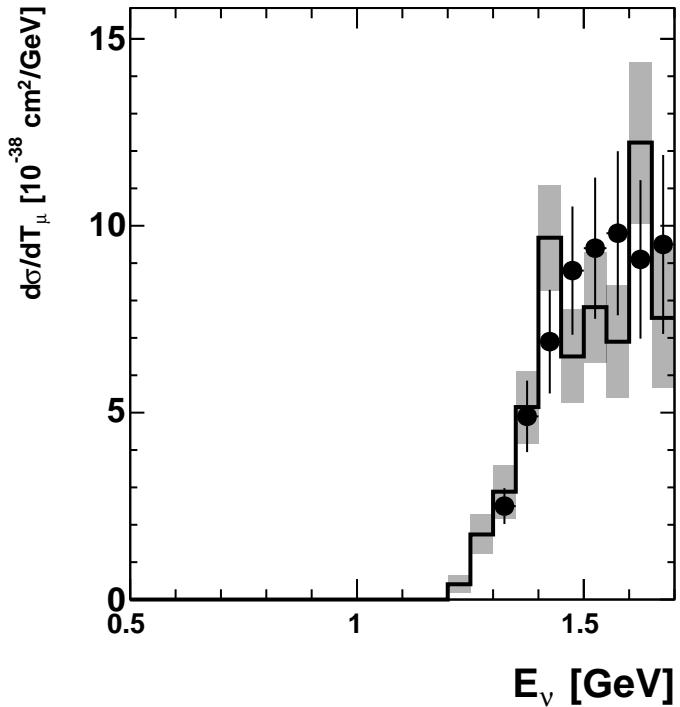
$T_\mu \in [0.6; 0.65] \text{ GeV}$  $T_\mu \in [0.65; 0.7] \text{ GeV}$  $T_\mu \in [0.7; 0.75] \text{ GeV}$  $T_\mu \in [0.75; 0.8] \text{ GeV}$ 

$T_\mu \in [0.8; 0.85] \text{ GeV}$ 

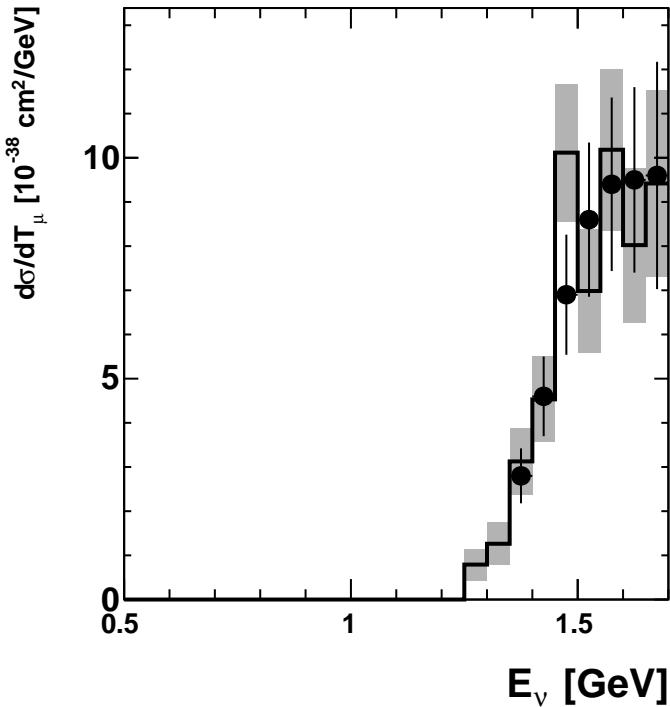
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 12.7/11 \text{ DoF}$  $T_\mu \in [0.85; 0.9] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

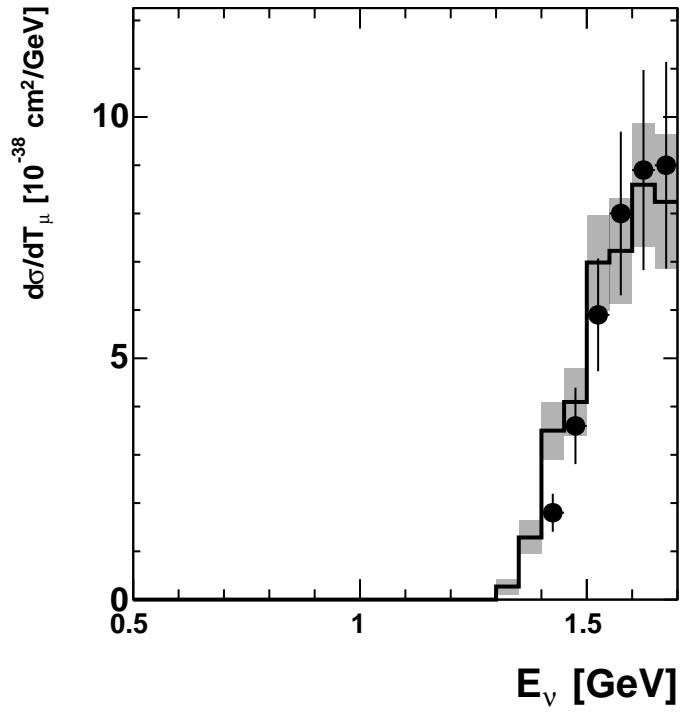
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 13.1/9 \text{ DoF}$  $T_\mu \in [0.9; 0.95] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

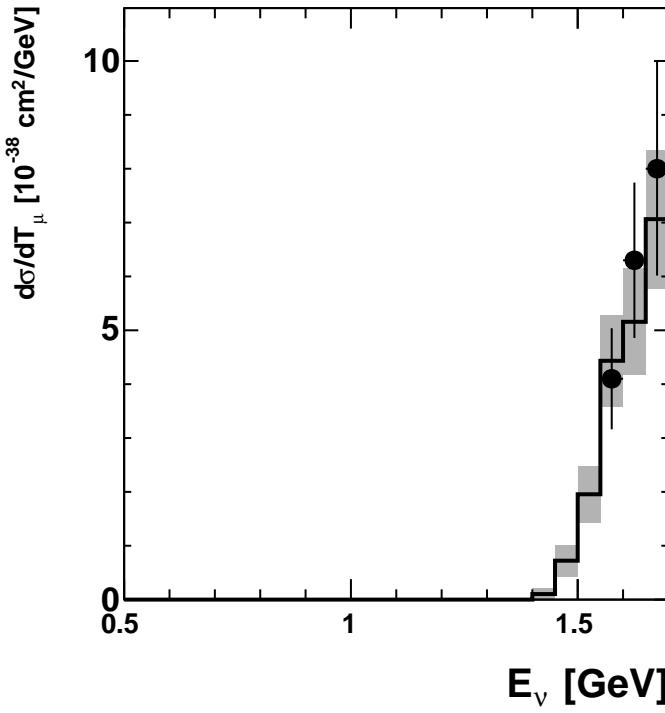
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.48/8 \text{ DoF}$  $T_\mu \in [0.95; 1] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

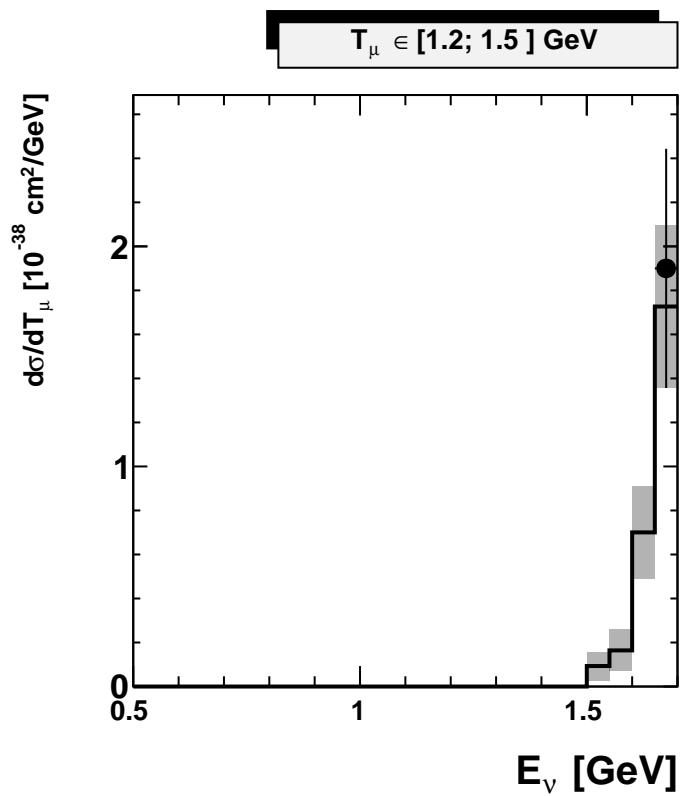
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 3.43/7 \text{ DoF}$

$T_\mu \in [1; 1.1] \text{ GeV}$  $T_\mu \in [1.1; 1.2] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 6.58/6 \text{ DoF}$ 

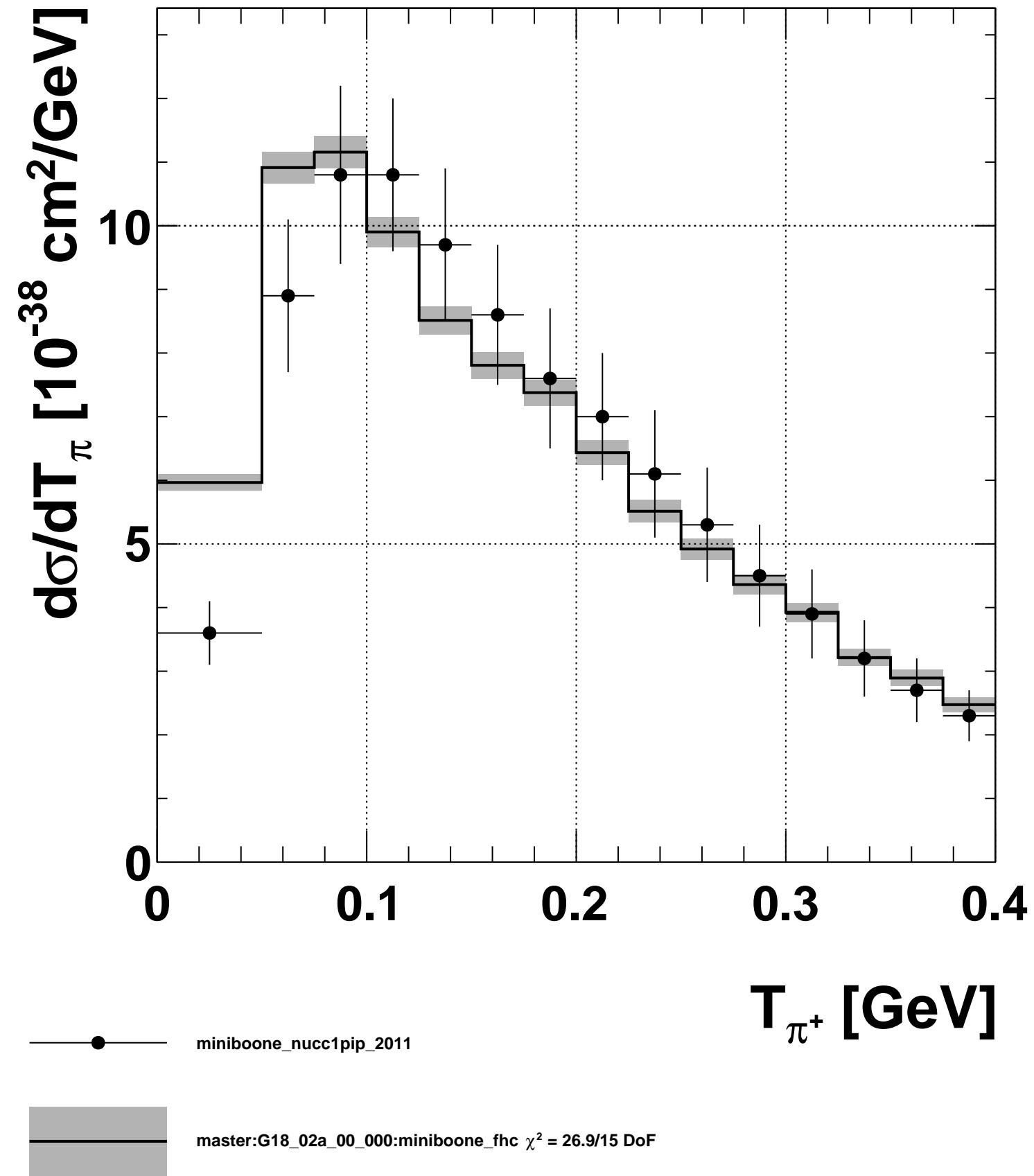
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 0.651/3 \text{ DoF}$ 

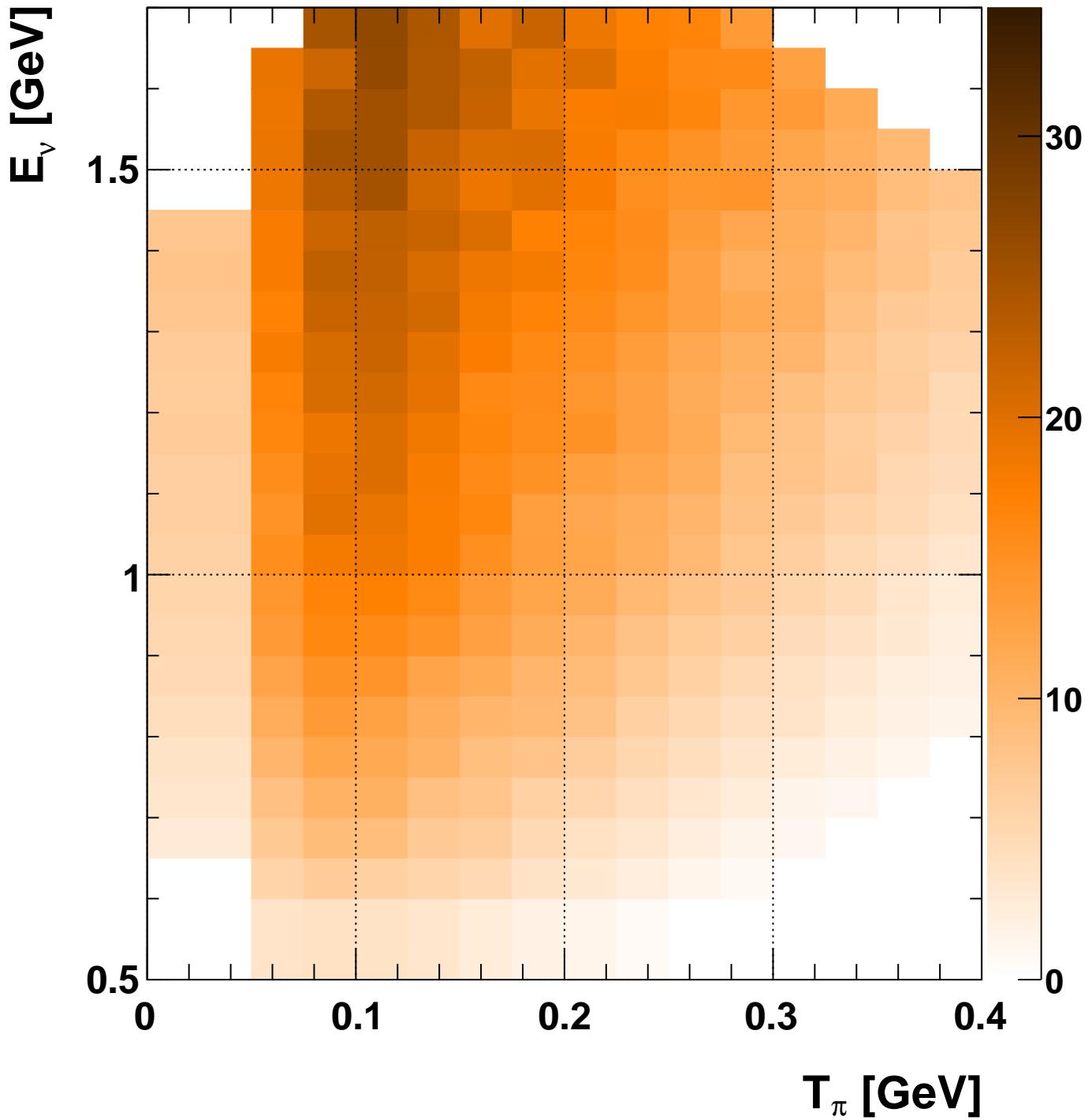
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 0.0697/1 \text{ DoF}$





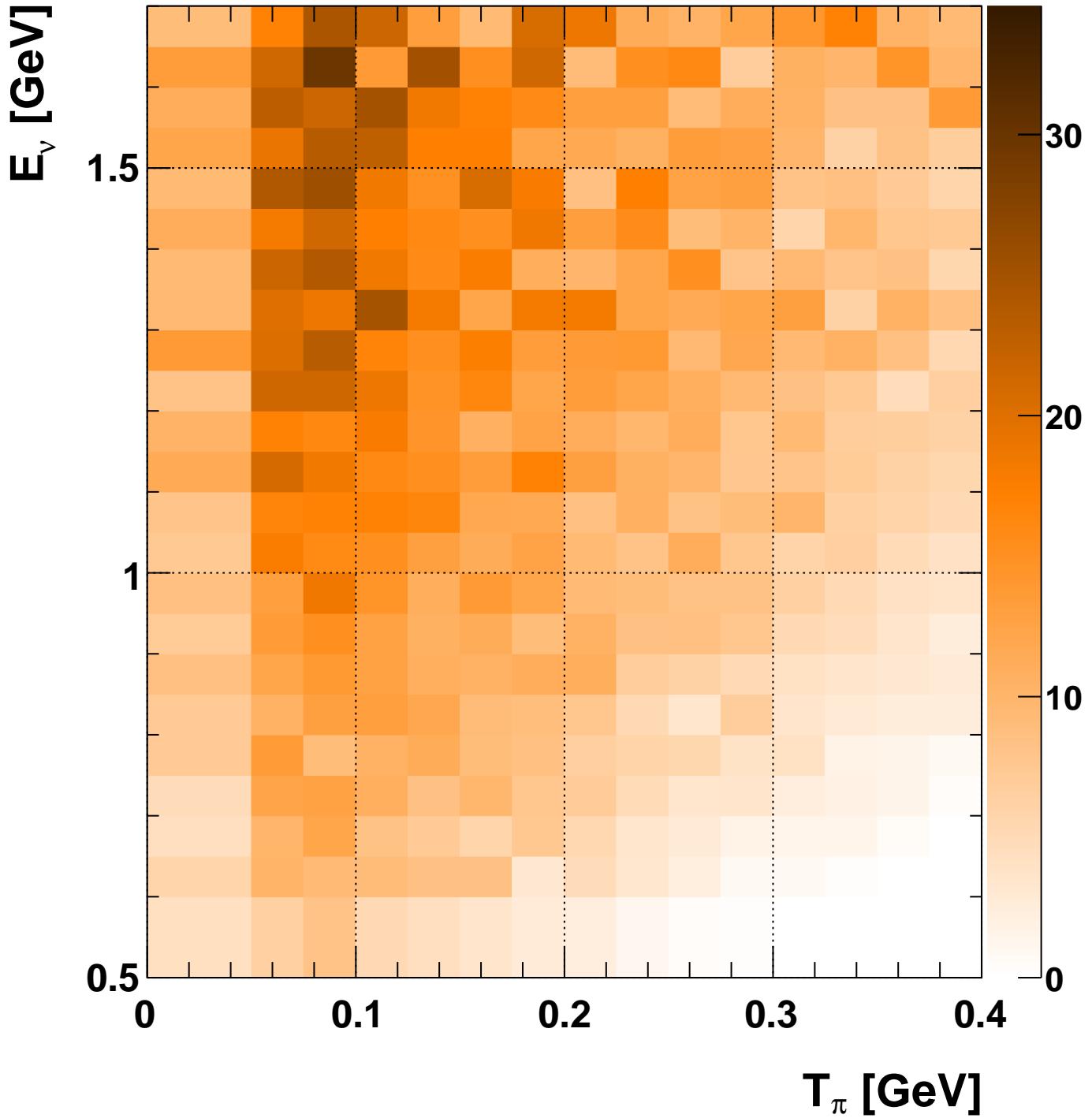
© 2003-2018, GENIE - <http://www.genie-mc.org>



$d\sigma/dT_\pi$  [ $10^{-38} \text{ cm}^2/\text{GeV}$ ]

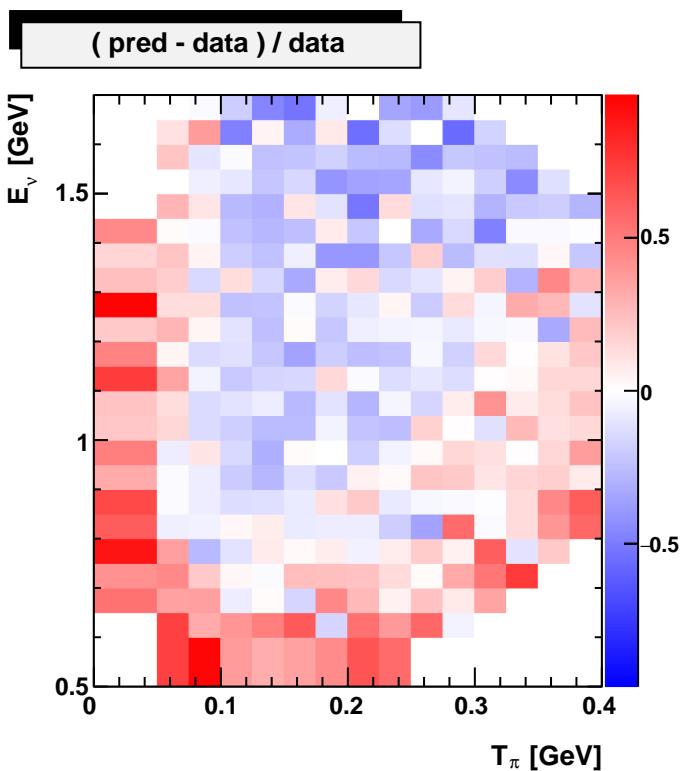
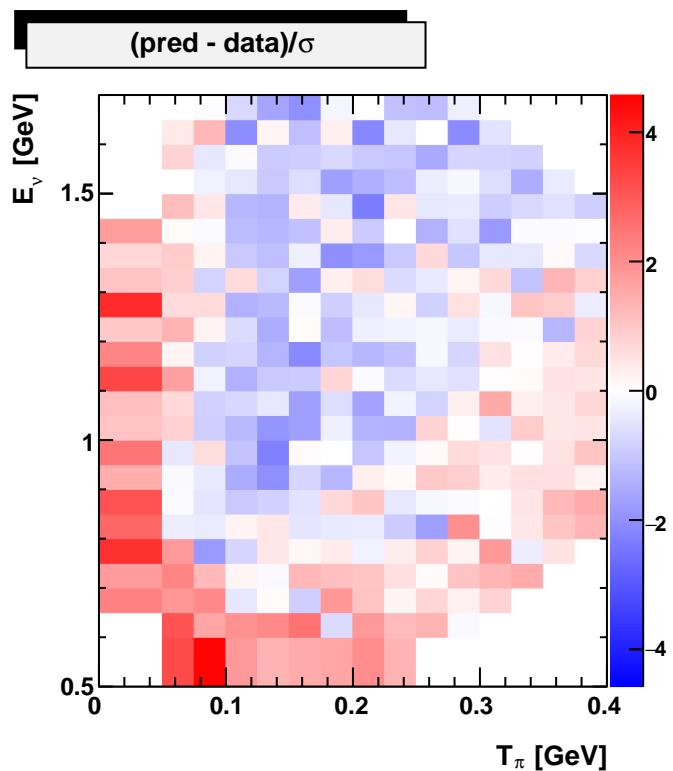
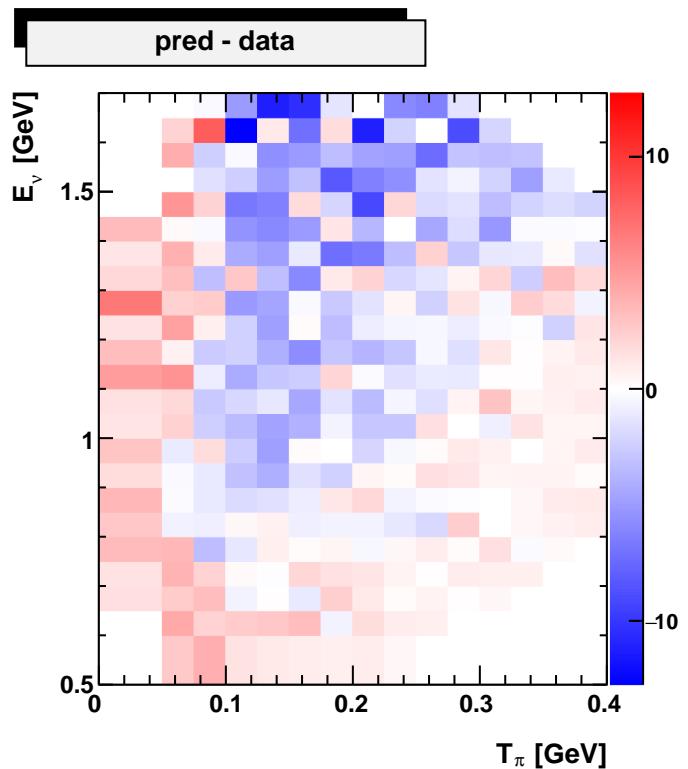
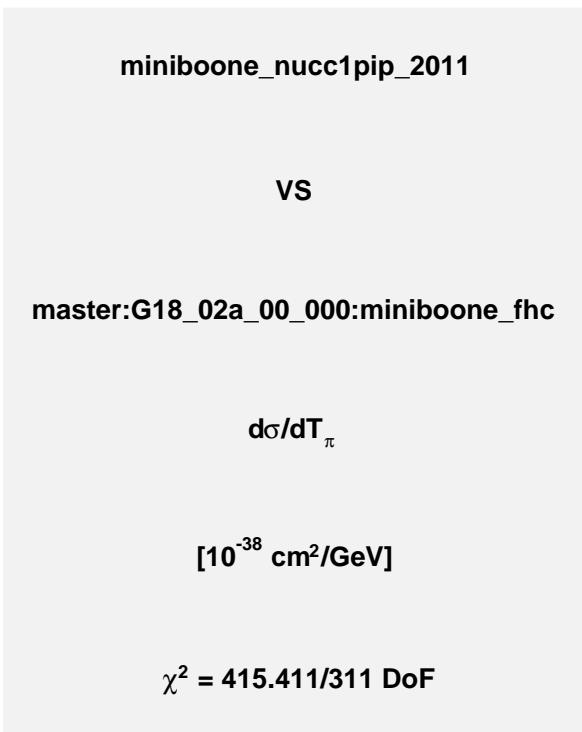
Data: miniboone\_nucc1pip\_2011

© 2003-2018, GENIE - <http://www.genie-mc.org>

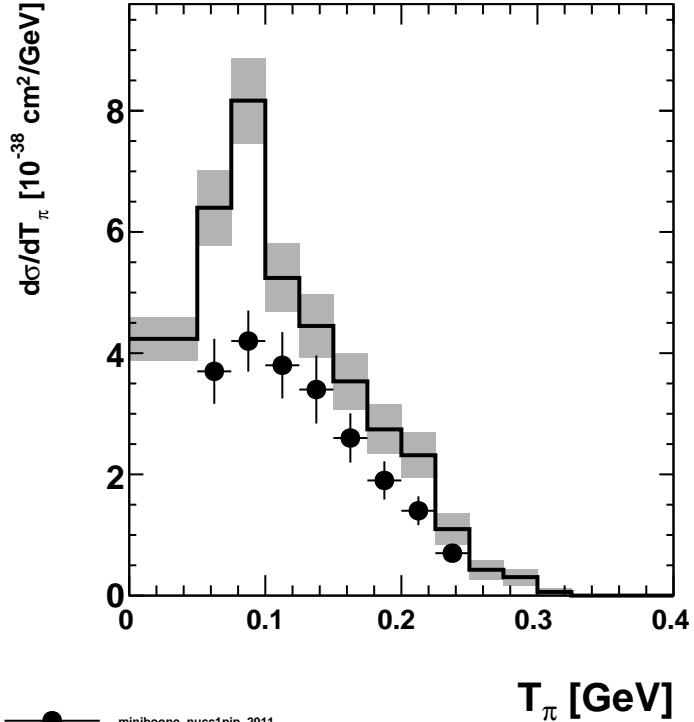
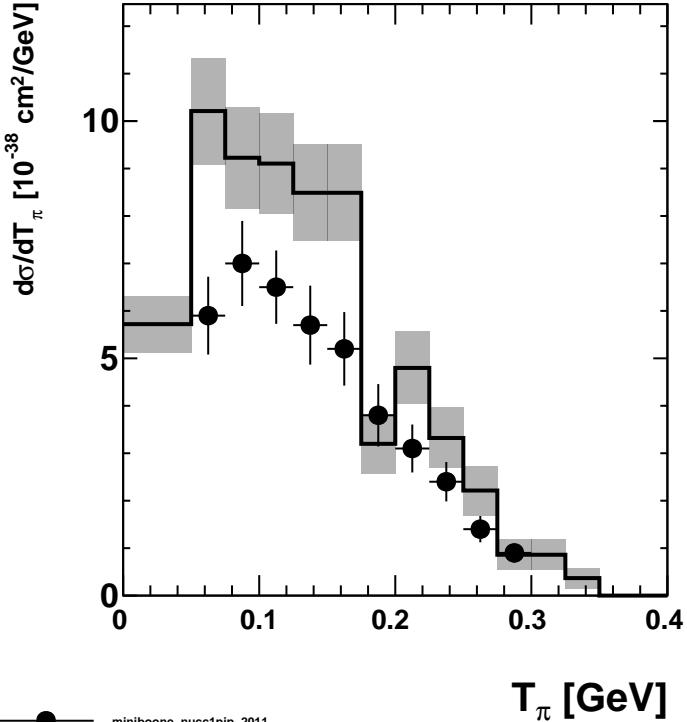
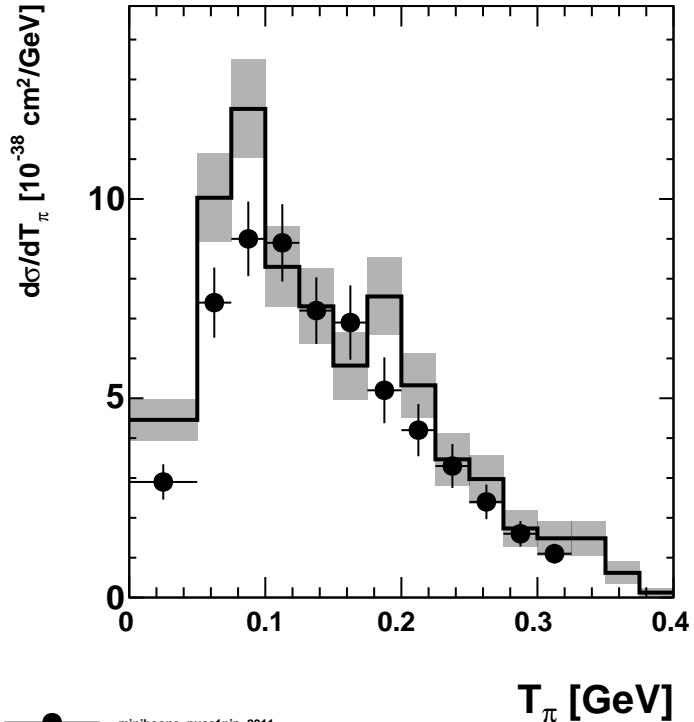
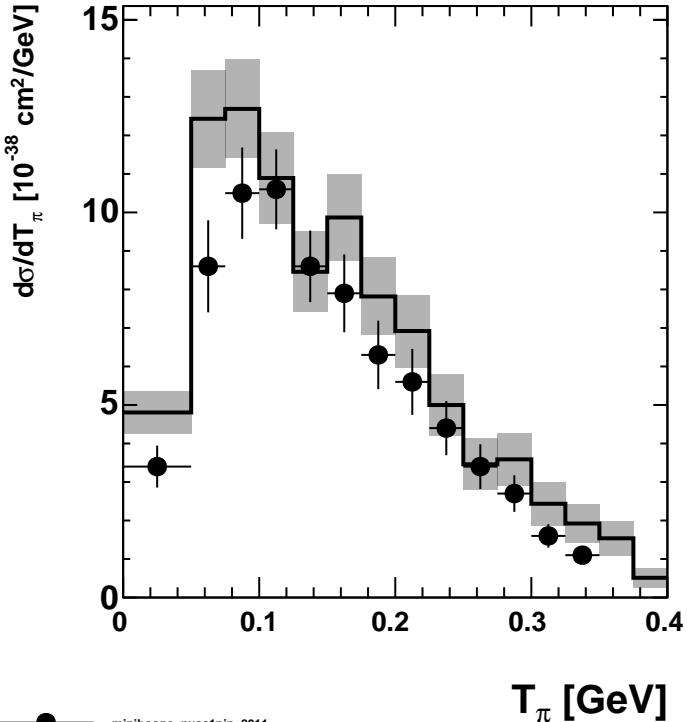


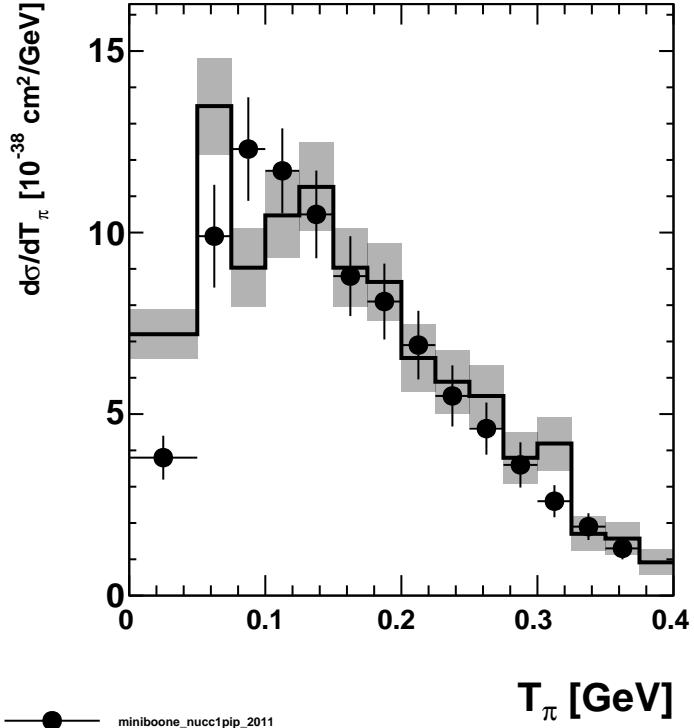
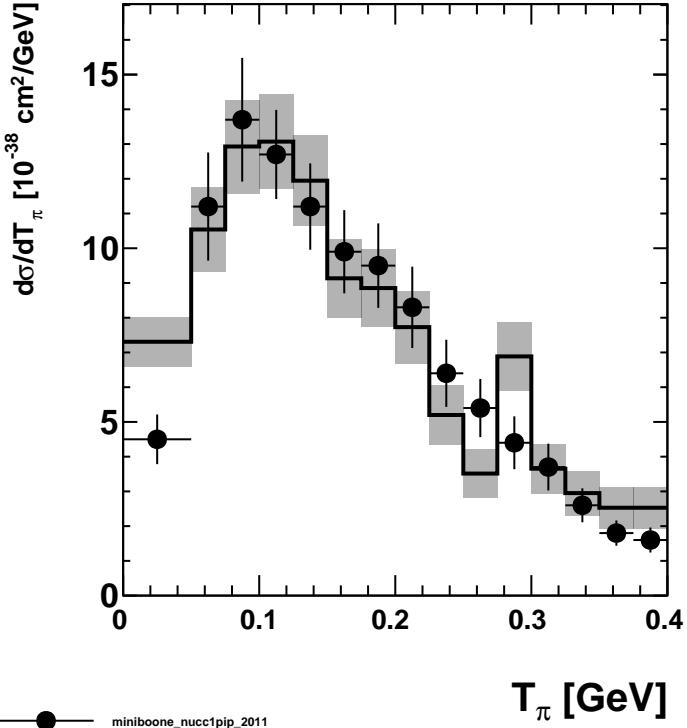
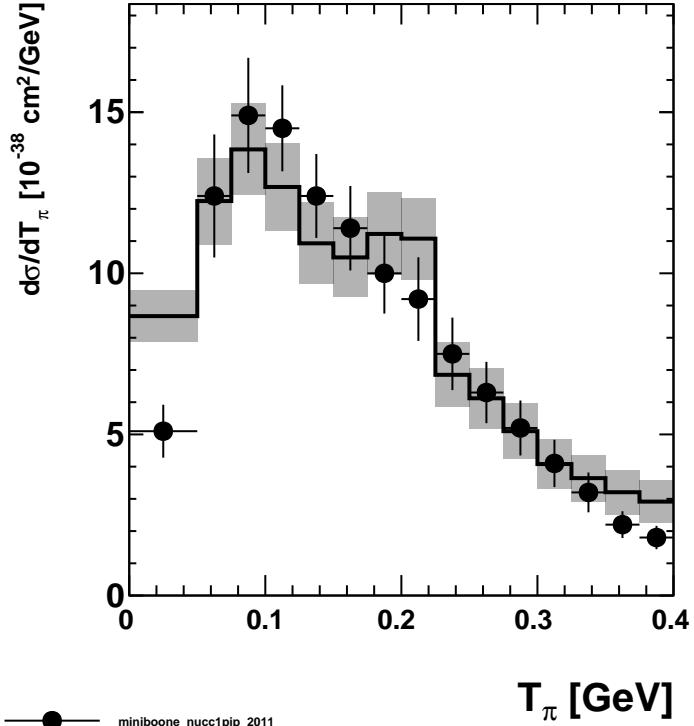
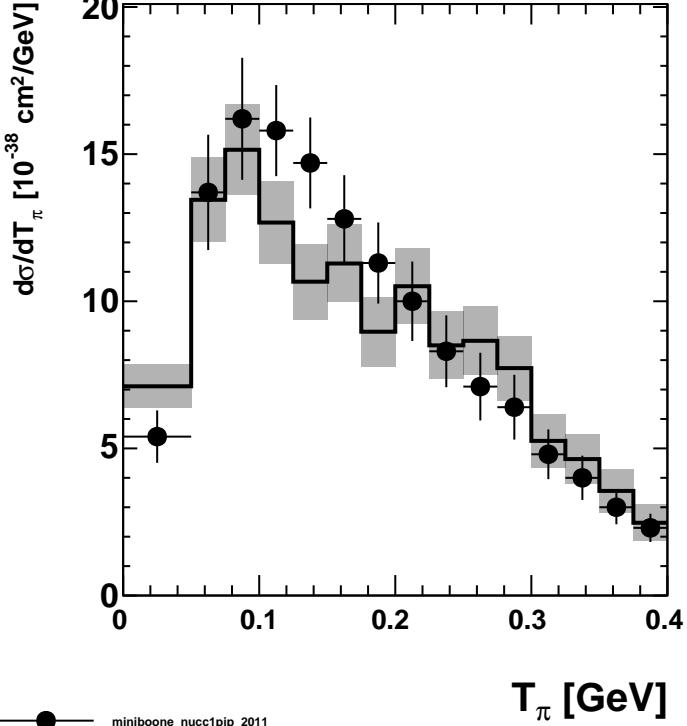
$d\sigma/dT_\pi$  [ $10^{-38} \text{ cm}^2/\text{GeV}$ ]

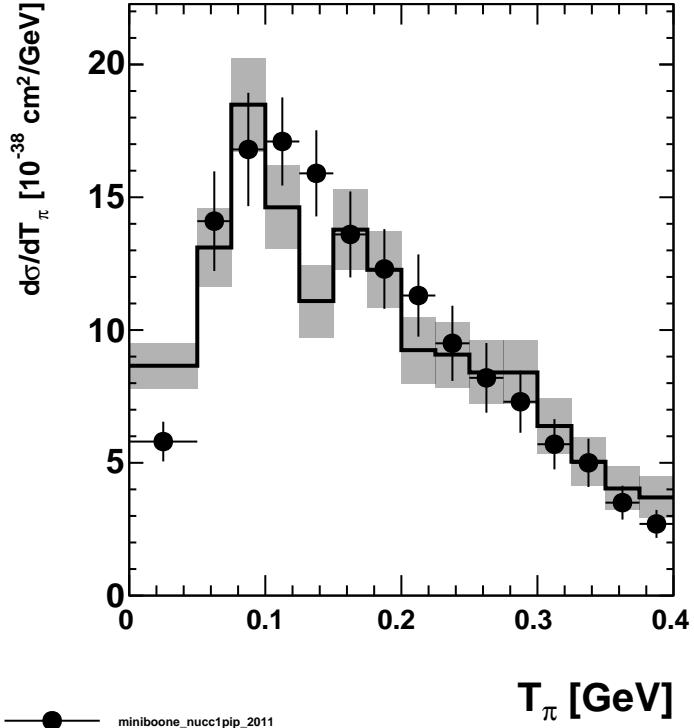
Pred: master:G18\_02a\_00\_000:miniboone\_fhc



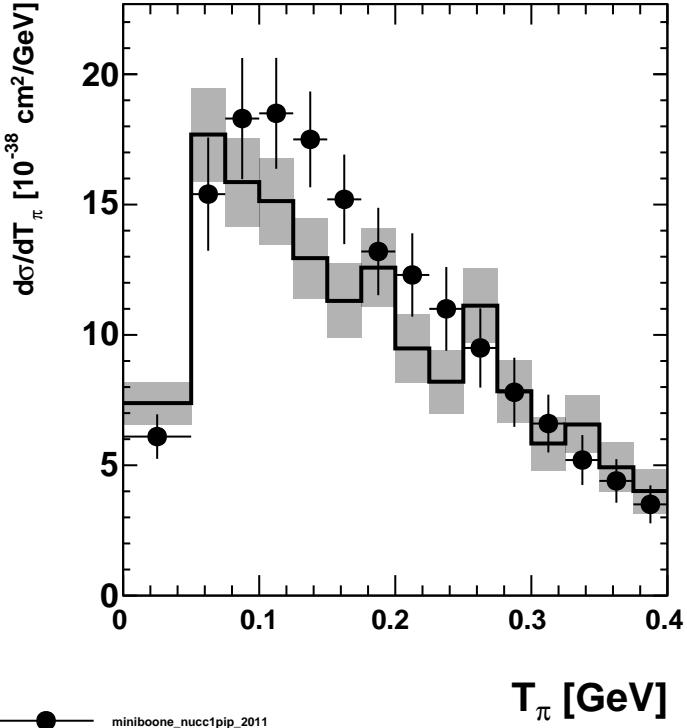


$E_\nu \in [0.5; 0.6] \text{ GeV}$  $E_\nu \in [0.6; 0.65] \text{ GeV}$  $E_\nu \in [0.65; 0.7] \text{ GeV}$  $E_\nu \in [0.7; 0.75] \text{ GeV}$ 

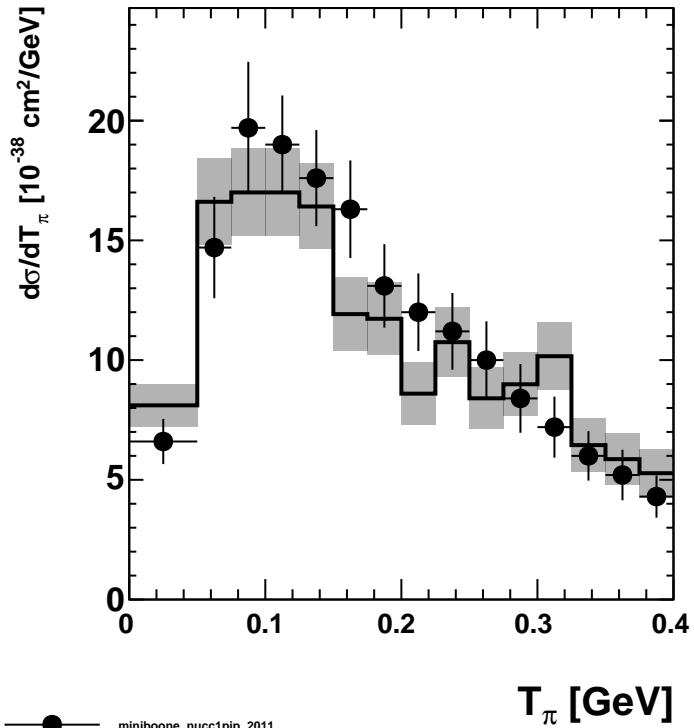
$E_\nu \in [0.75; 0.8] \text{ GeV}$  $E_\nu \in [0.8; 0.85] \text{ GeV}$  $E_\nu \in [0.85; 0.9] \text{ GeV}$  $E_\nu \in [0.9; 0.95] \text{ GeV}$ 

$E_\nu \in [0.95; 1] \text{ GeV}$ 

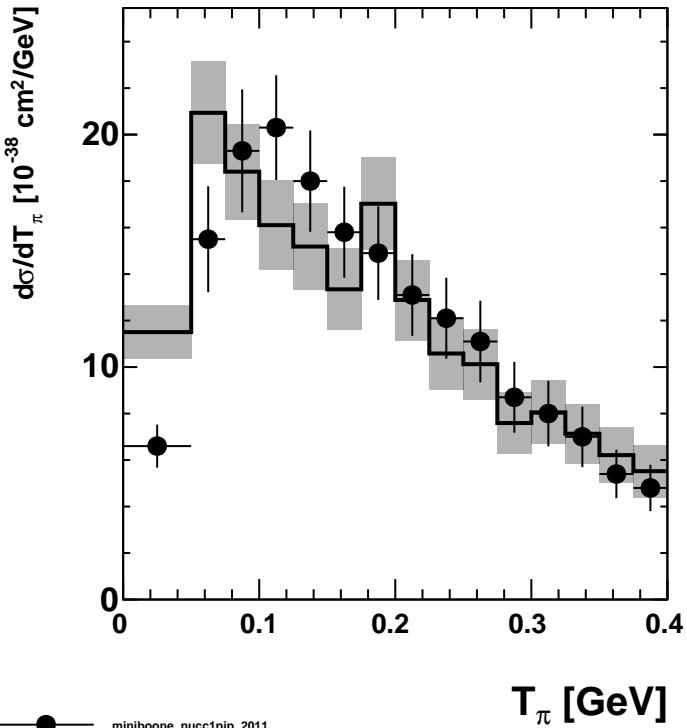
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 16.4/15 \text{ DoF}$  $T_\pi [\text{GeV}]$  $E_\nu \in [1; 1.05] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

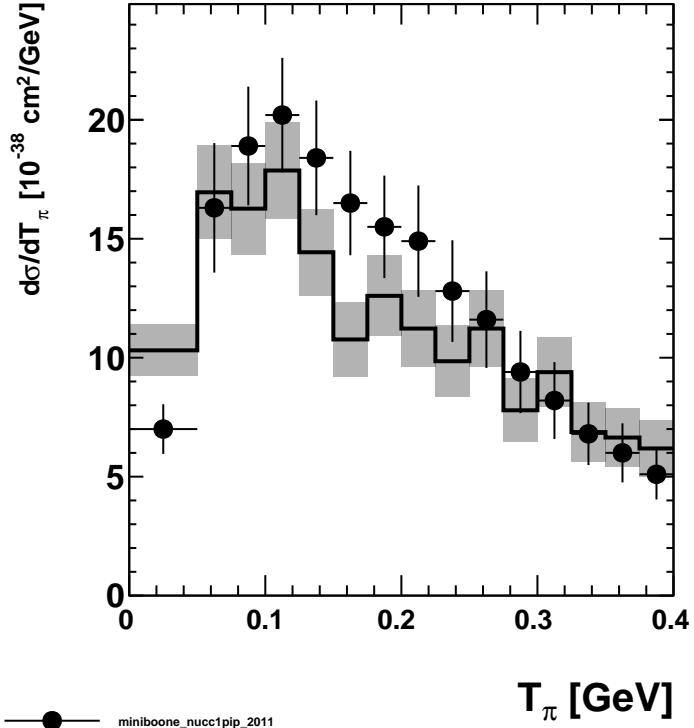
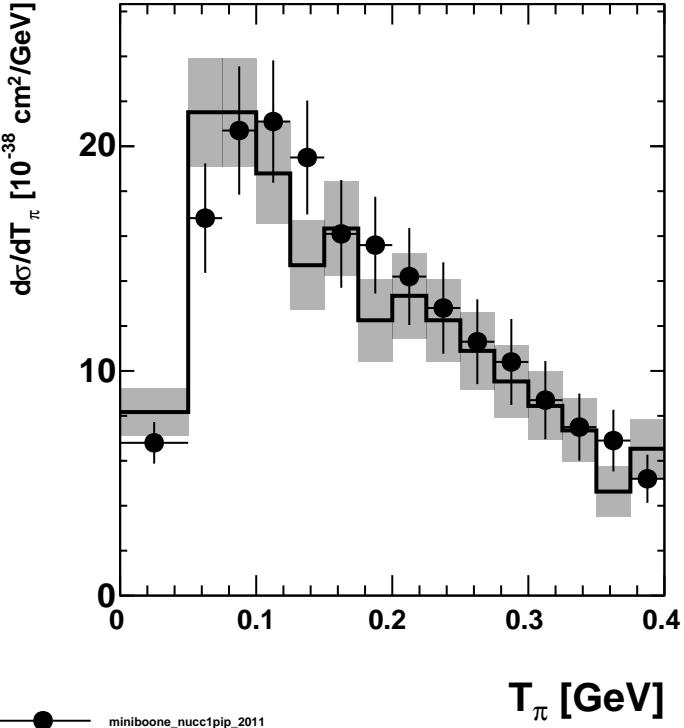
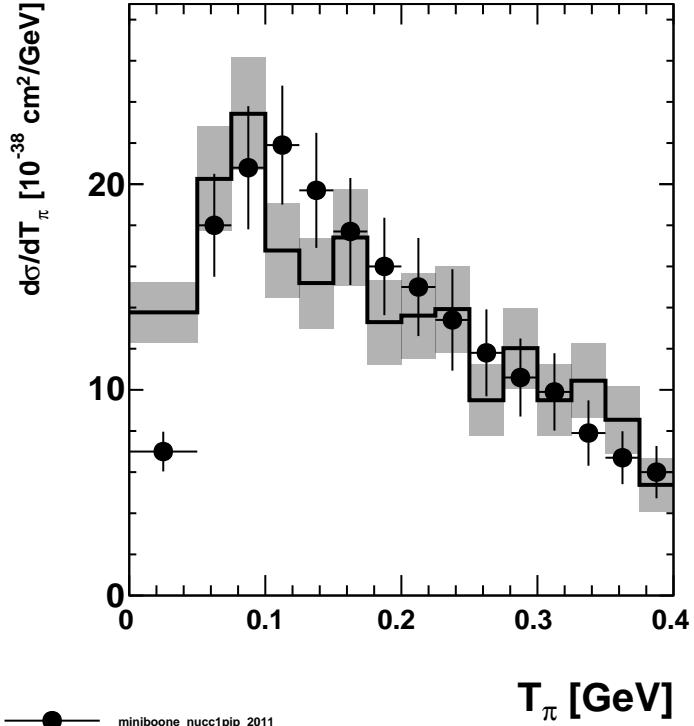
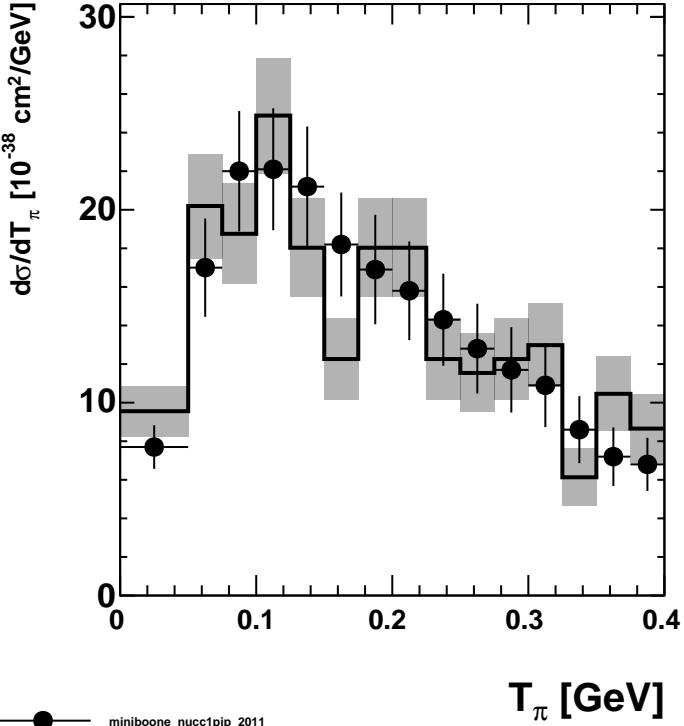
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 16.7/15 \text{ DoF}$  $T_\pi [\text{GeV}]$  $E_\nu \in [1.05; 1.1] \text{ GeV}$ 

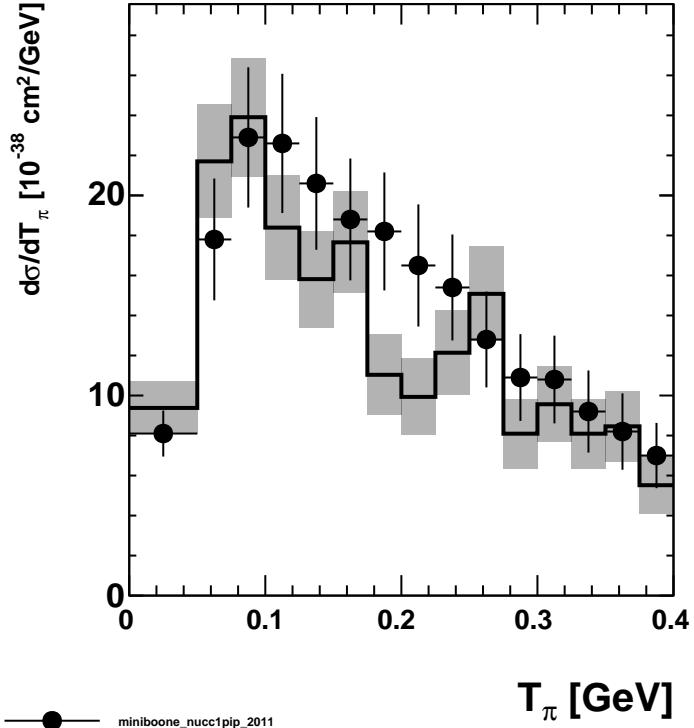
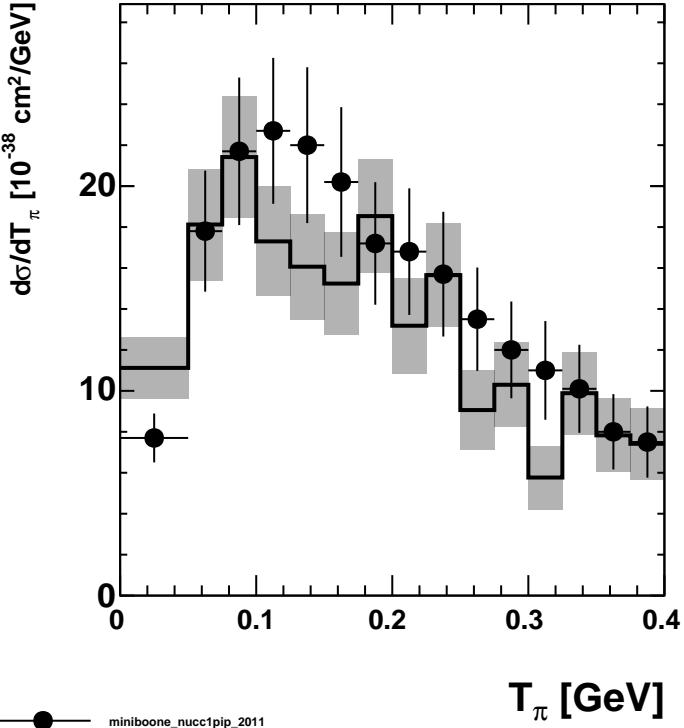
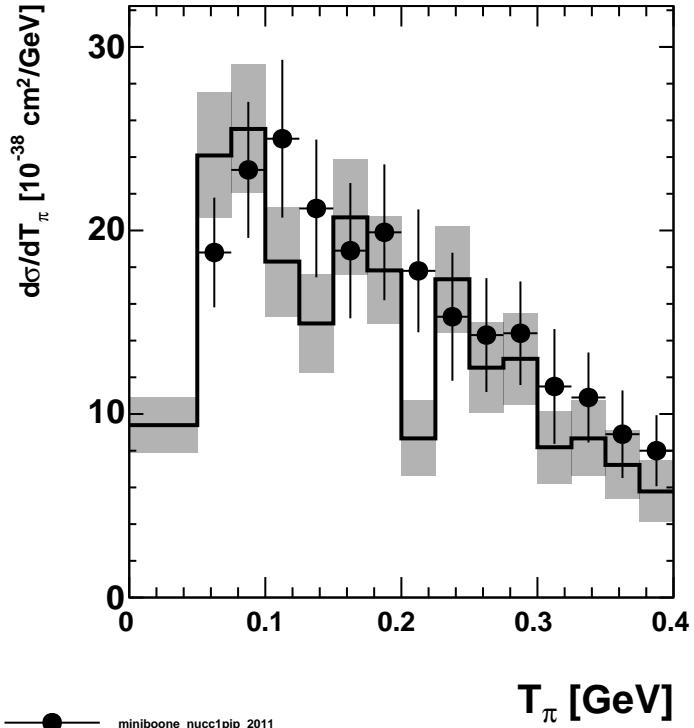
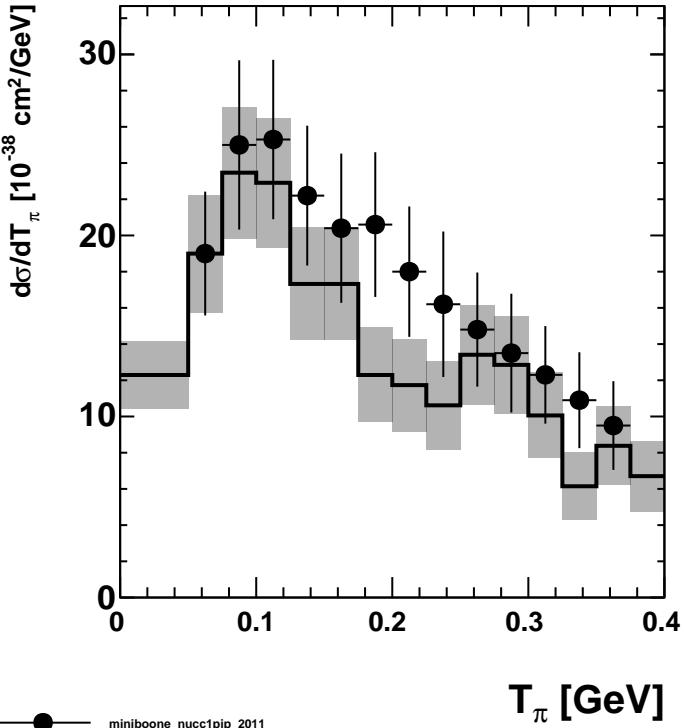
miniboone\_nucc1pip\_2011

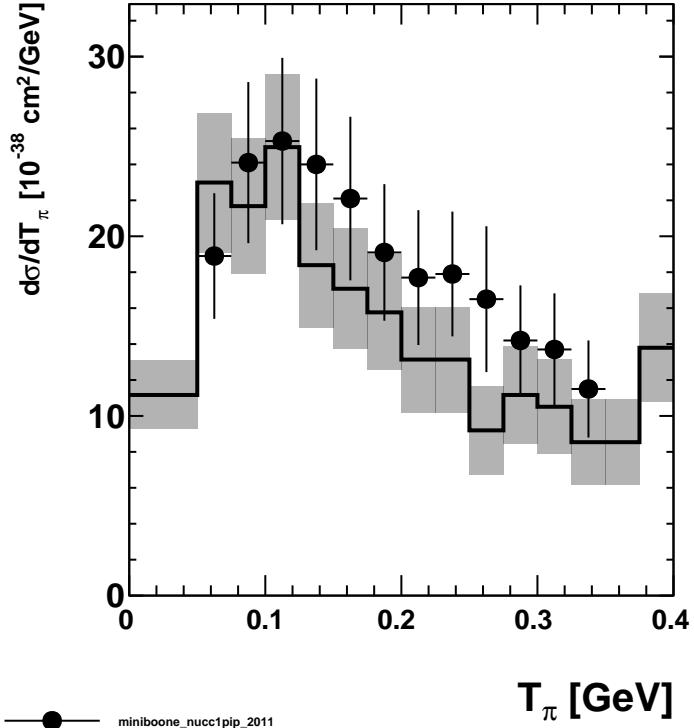
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 13.2/15 \text{ DoF}$  $T_\pi [\text{GeV}]$  $E_\nu \in [1.1; 1.15] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

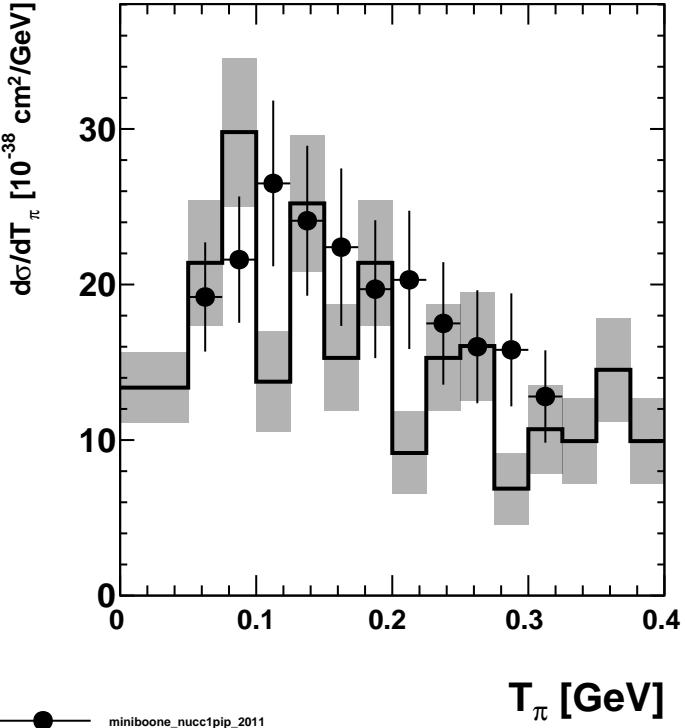
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 19.9/15 \text{ DoF}$  $T_\pi [\text{GeV}]$

$E_\nu \in [1.15; 1.2] \text{ GeV}$  $E_\nu \in [1.2; 1.25] \text{ GeV}$  $E_\nu \in [1.25; 1.3] \text{ GeV}$  $E_\nu \in [1.3; 1.35] \text{ GeV}$ 

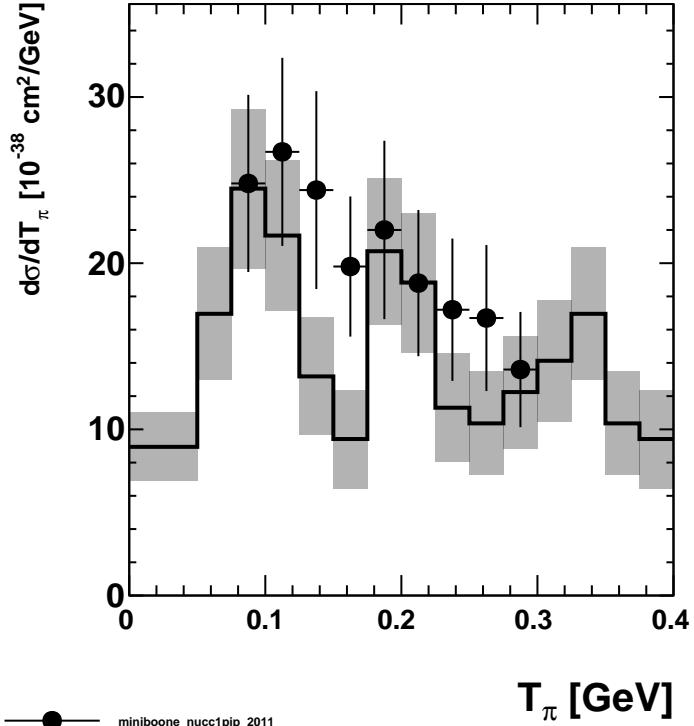
$E_\nu \in [1.35; 1.4] \text{ GeV}$  $E_\nu \in [1.4; 1.45] \text{ GeV}$  $E_\nu \in [1.45; 1.5] \text{ GeV}$  $E_\nu \in [1.5; 1.55] \text{ GeV}$ 

$E_\nu \in [1.55; 1.6] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

 master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.15/12 \text{ DoF}$  $E_\nu \in [1.6; 1.65] \text{ GeV}$ 

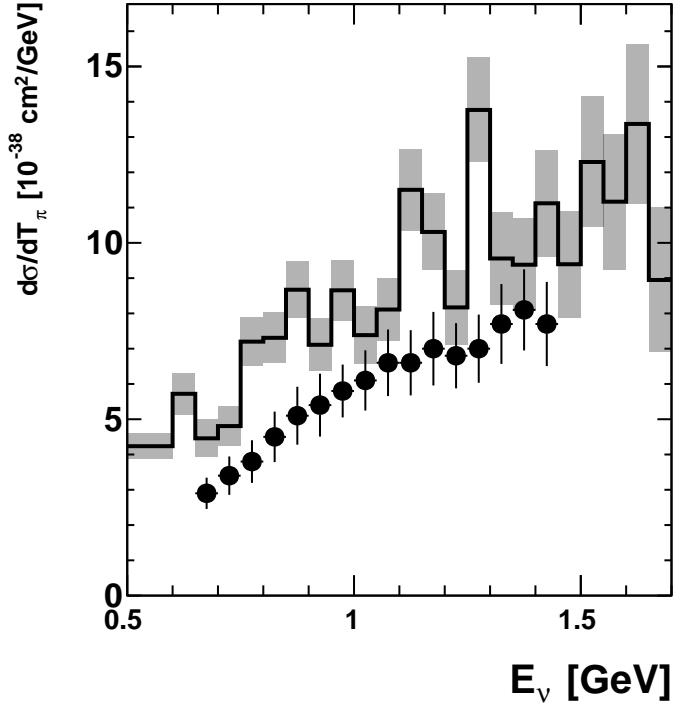
miniboone\_nucc1pip\_2011

 master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 16.9/11 \text{ DoF}$  $E_\nu \in [1.65; 1.7] \text{ GeV}$ 

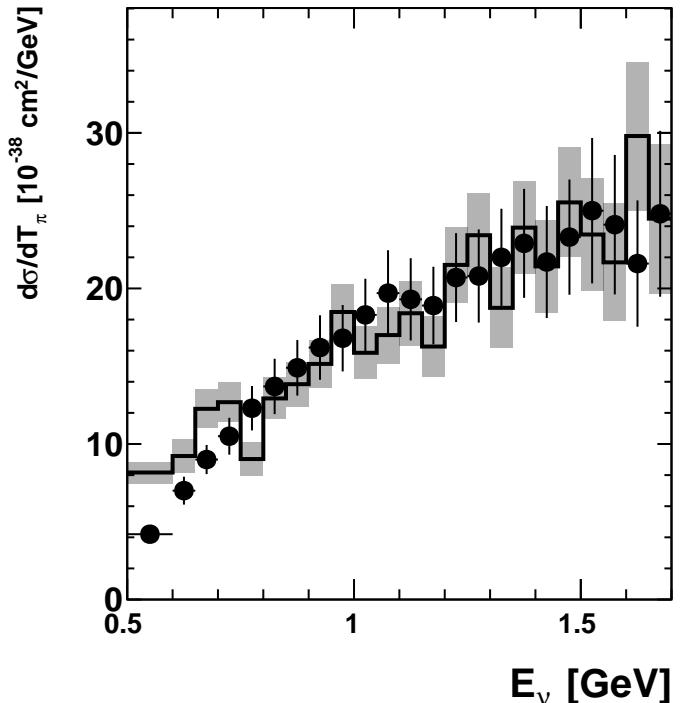
miniboone\_nucc1pip\_2011

 master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.85/9 \text{ DoF}$

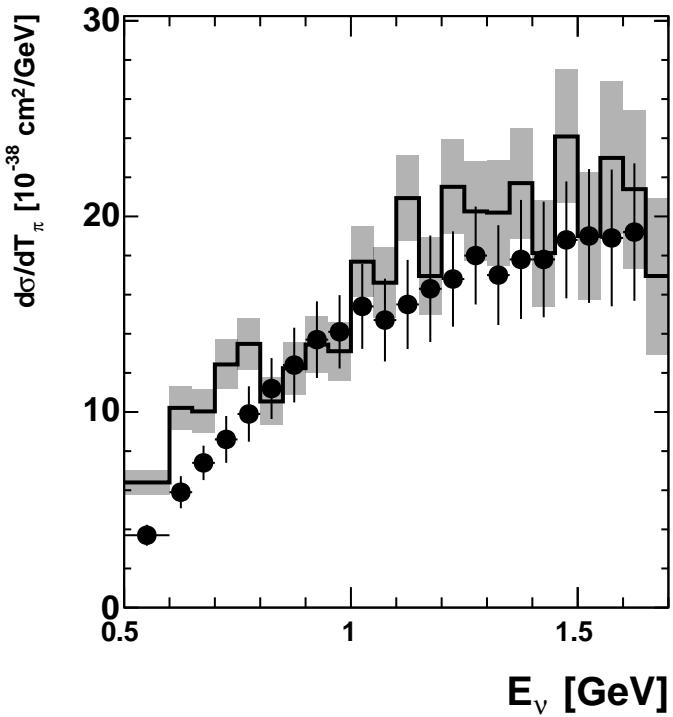


$T_\pi \in [0; 0.05] \text{ GeV}$ 

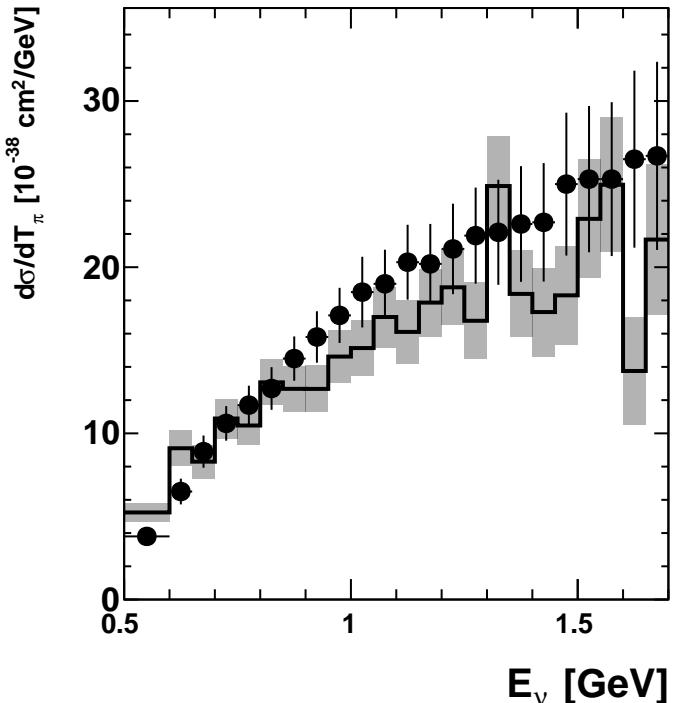
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 87.1/16 \text{ DoF}$  $T_\pi \in [0.075; 0.1] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

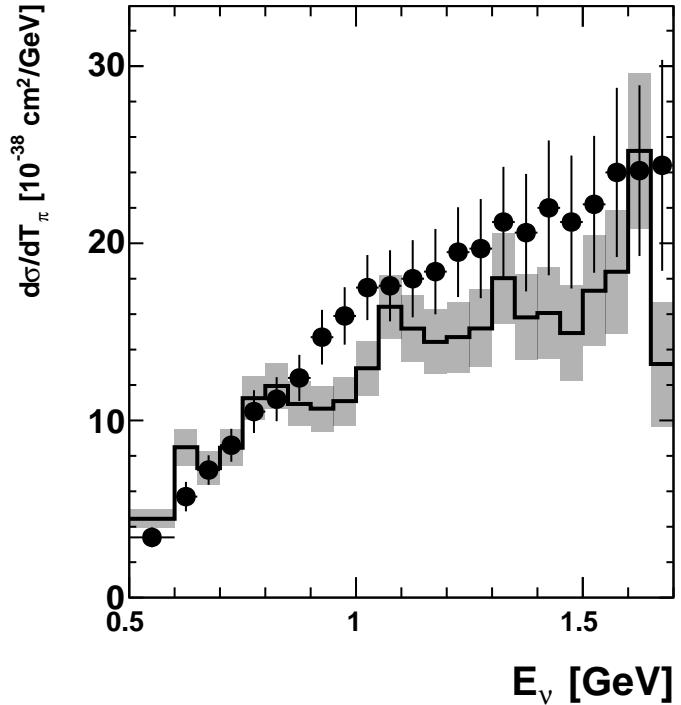
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 39.1/23 \text{ DoF}$  $T_\pi \in [0.05; 0.075] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

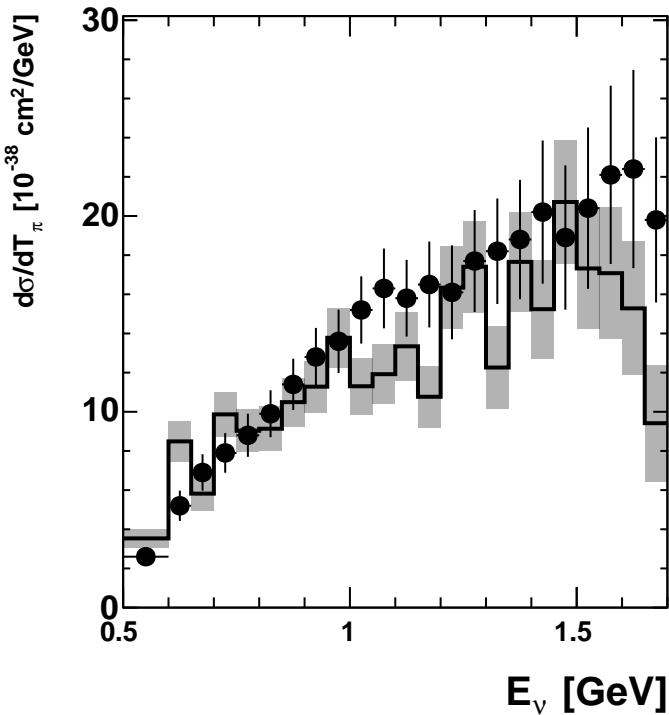
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 42.6/22 \text{ DoF}$  $T_\pi \in [0.1; 0.125] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

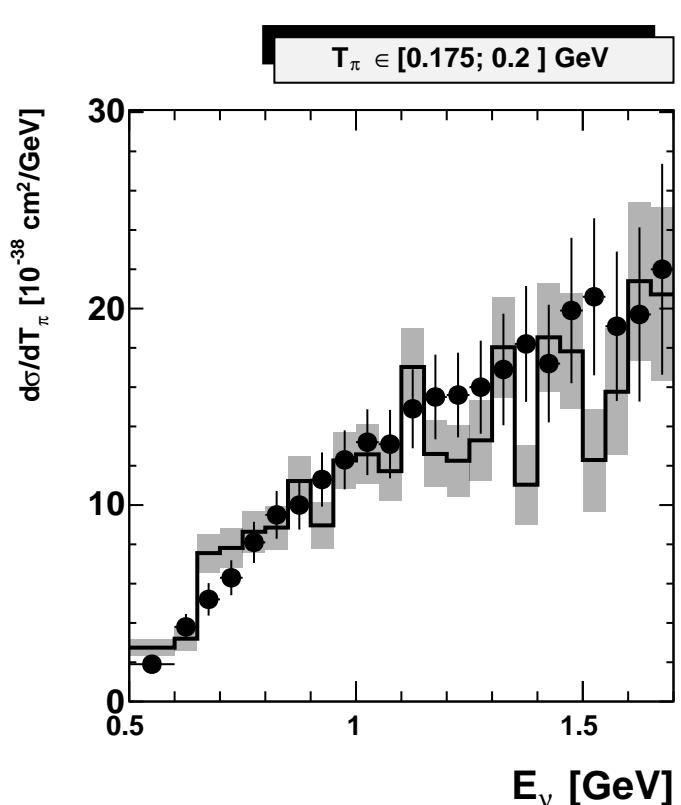
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 28.7/23 \text{ DoF}$

$T_\pi \in [0.125; 0.15] \text{ GeV}$ 

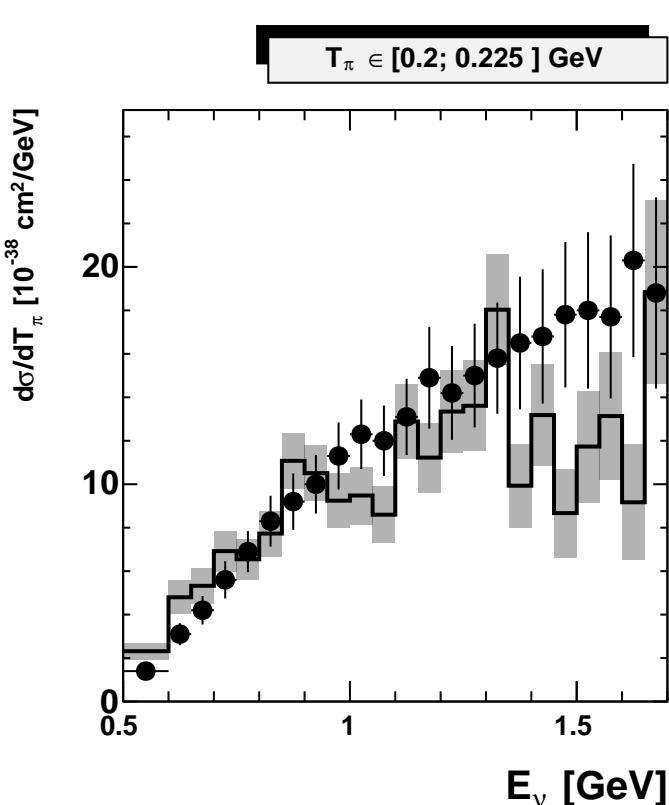
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 36.9/23$  DoF $T_\pi \in [0.15; 0.175] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

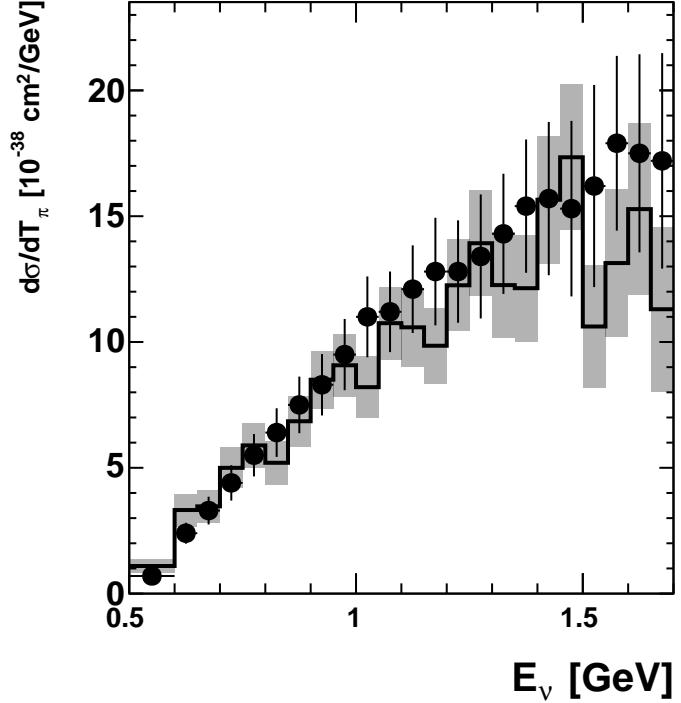
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 34.8/23$  DoF $T_\pi \in [0.175; 0.2] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

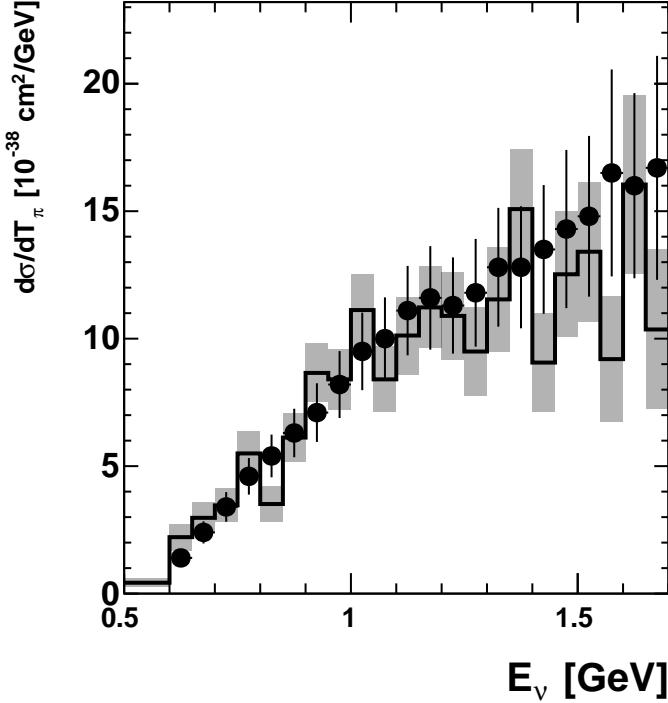
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 22.5/23$  DoF $T_\pi \in [0.2; 0.225] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

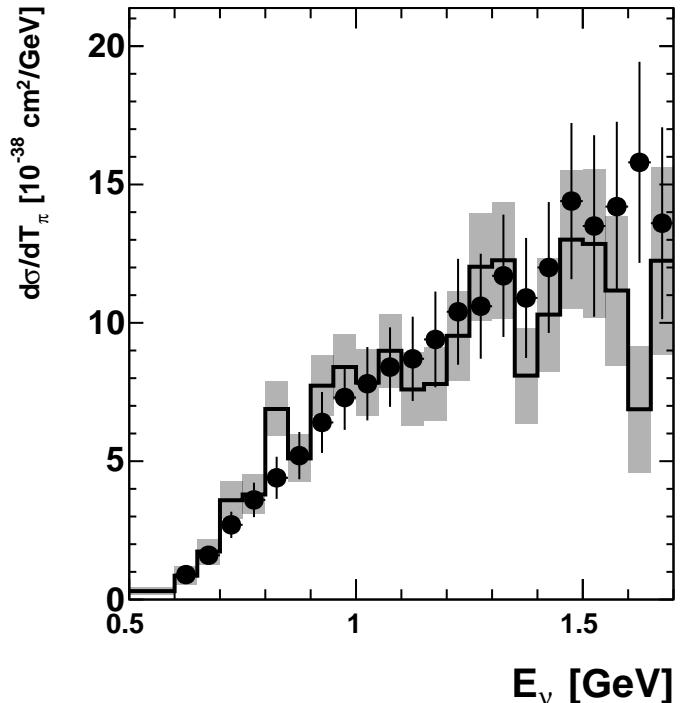
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 36.4/23$  DoF

$T_\pi \in [0.225; 0.25] \text{ GeV}$ 

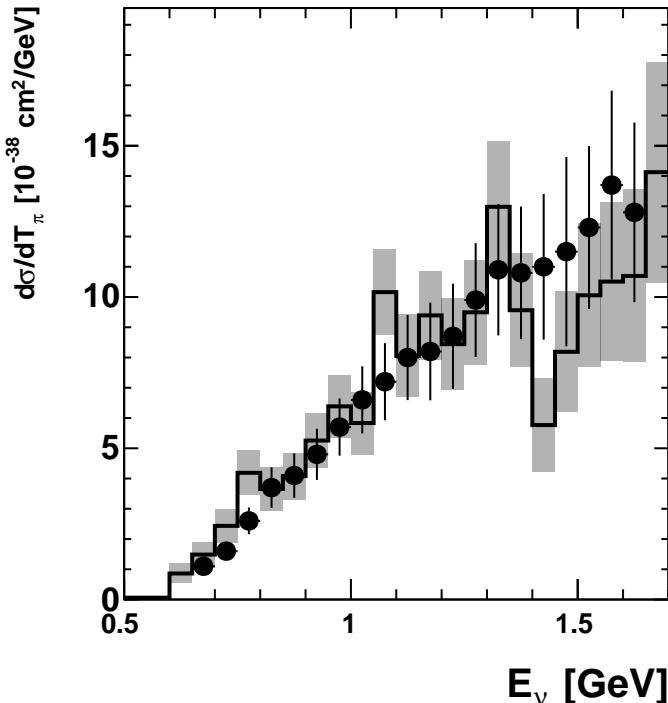
miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 14/23 \text{ DoF}$  $T_\pi \in [0.25; 0.275] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

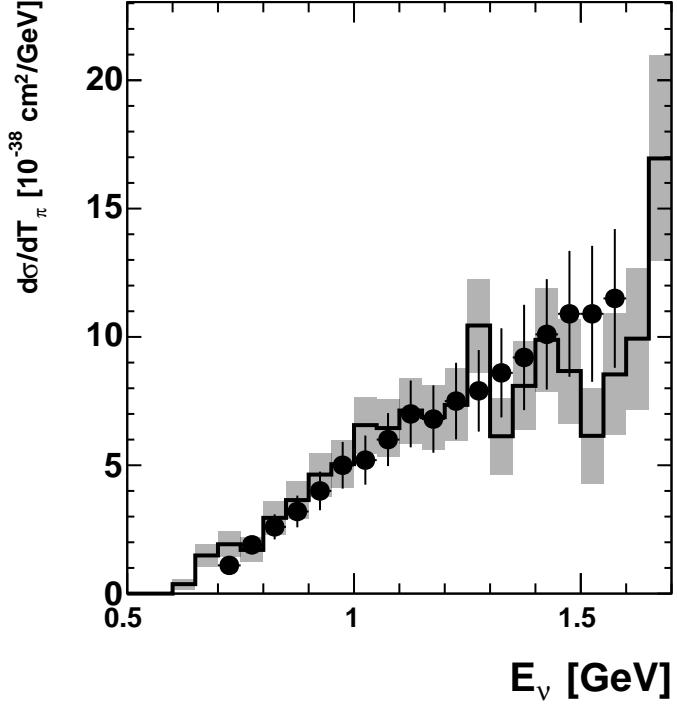
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 15.8/22 \text{ DoF}$  $T_\pi \in [0.275; 0.3] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

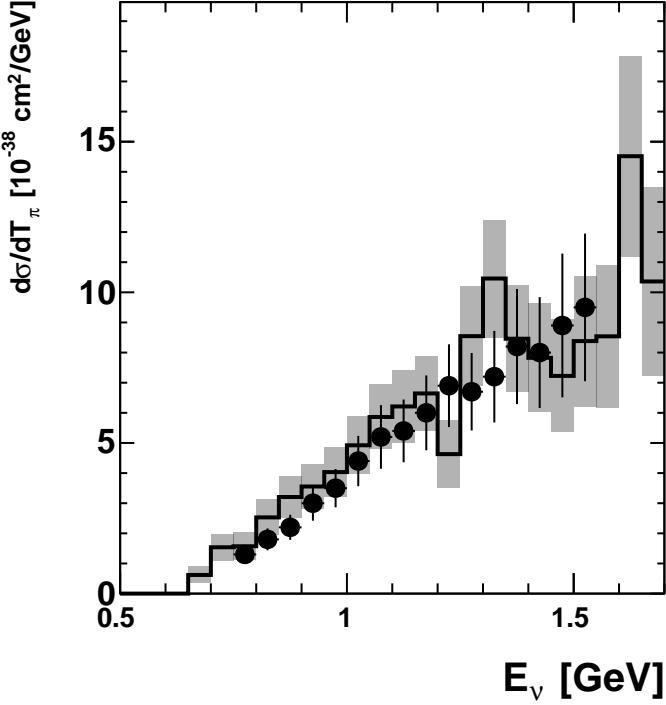
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 14.2/22 \text{ DoF}$  $T_\pi \in [0.3; 0.325] \text{ GeV}$ 

miniboone\_nucc1pip\_2011

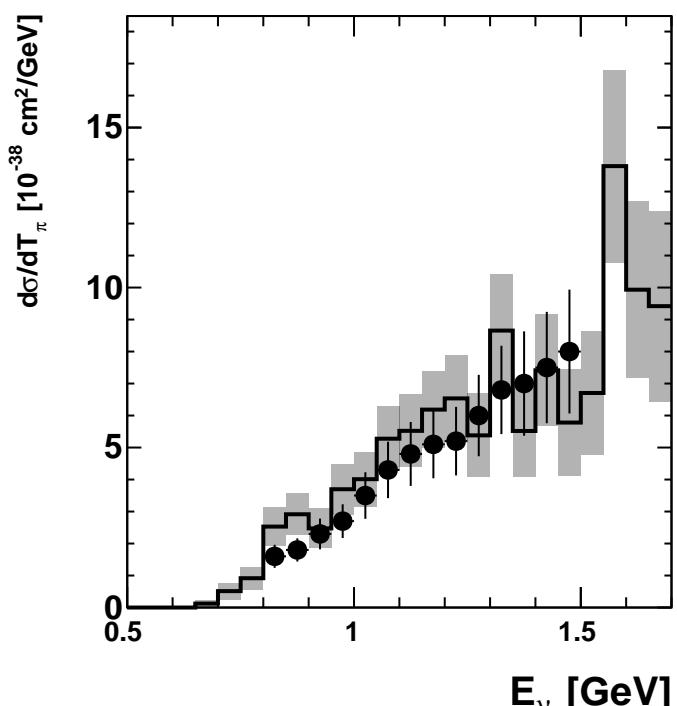
master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 15.2/20 \text{ DoF}$

$T_\pi \in [0.325; 0.35] \text{ GeV}$ 

● miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.86/18$  DoF $T_\pi \in [0.35; 0.375] \text{ GeV}$ 

● miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 8.9/16$  DoF $T_\pi \in [0.375; 0.4] \text{ GeV}$ 

● miniboone\_nucc1pip\_2011

master:G18\_02a\_00\_000:miniboone\_fhc  $\chi^2 = 9.23/14$  DoF



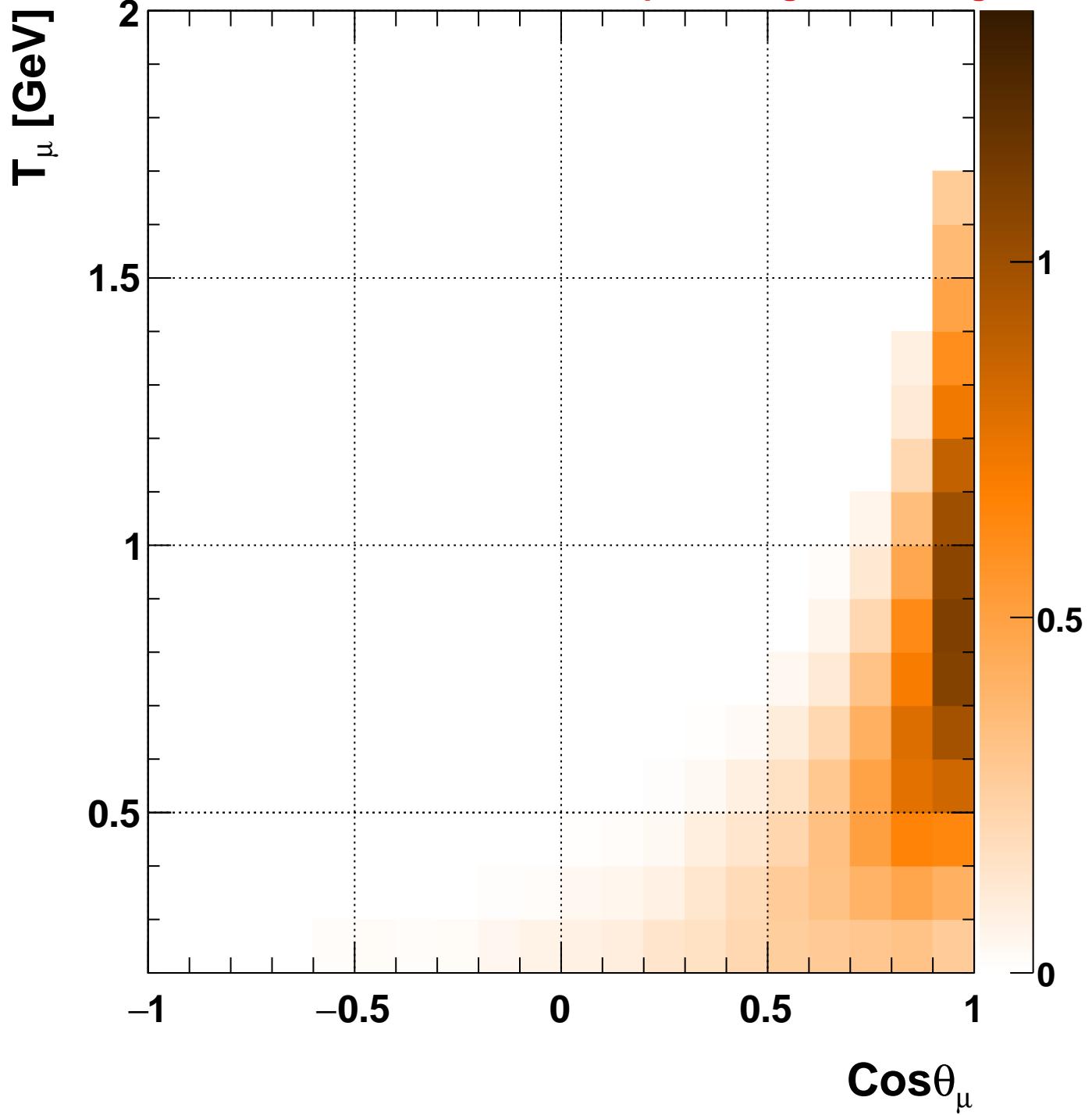
**Dataset:**  
**miniboone\_nubarccqe\_2013**

**Model:**  
**master/G18\_02a\_00\_000  $\chi^2 = 63.9 / 78$  DoF**

**Plot:**  
 $\partial^2 \sigma(\bar{\nu}_\mu \text{ CC } 0\pi) / \partial \text{Cos}\theta_\mu / \partial T_\mu$   
**78 DoF,  $\chi^2 = 63.9$**

**2018/10/15 09:40:43**

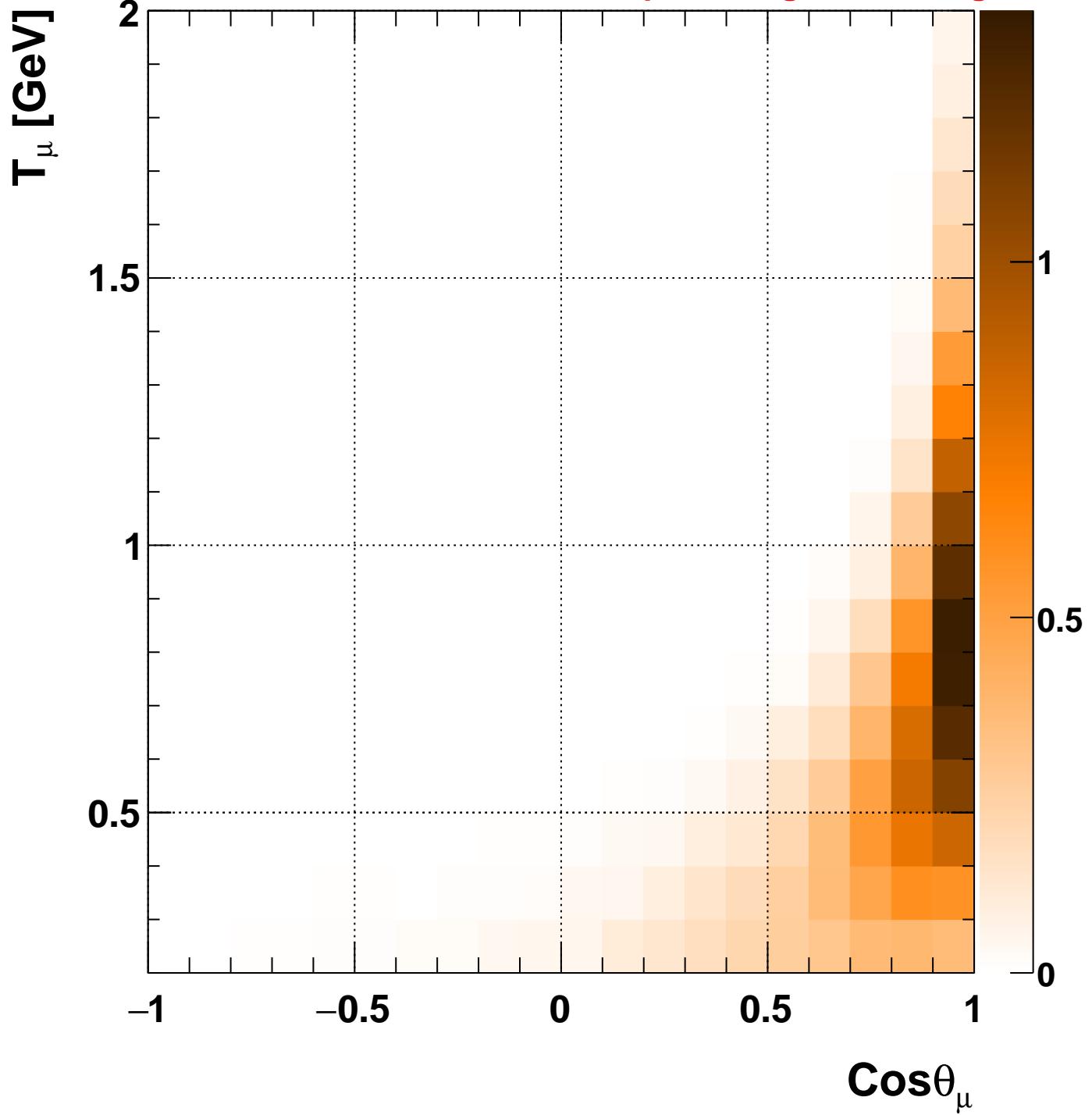
© 2003-2018, GENIE - <http://www.genie-mc.org>



$\partial^2 \sigma(\bar{\nu}_\mu \text{ CC } 0\pi) / \partial \text{Cos}\theta_\mu / \partial T_\mu [10^{-38} \text{ cm}^2/\text{GeV/n}]$

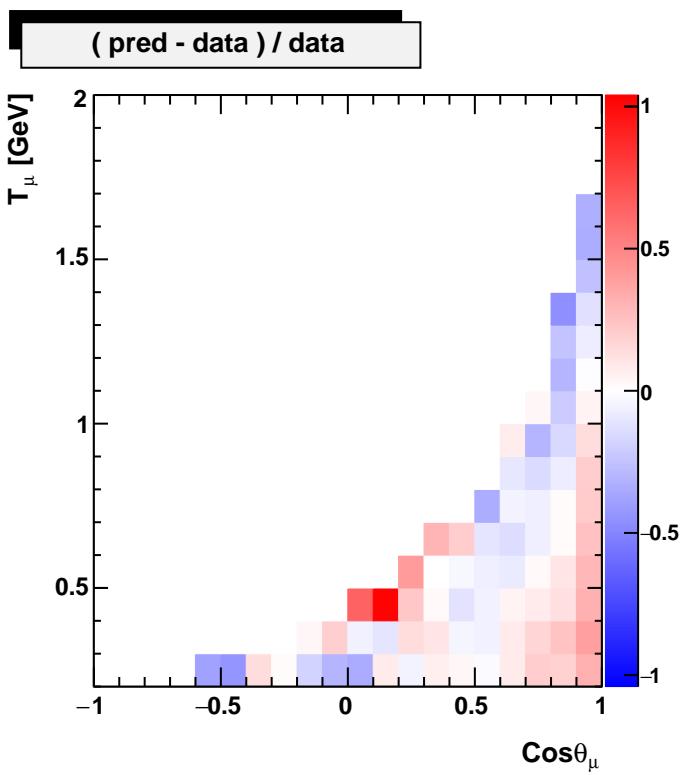
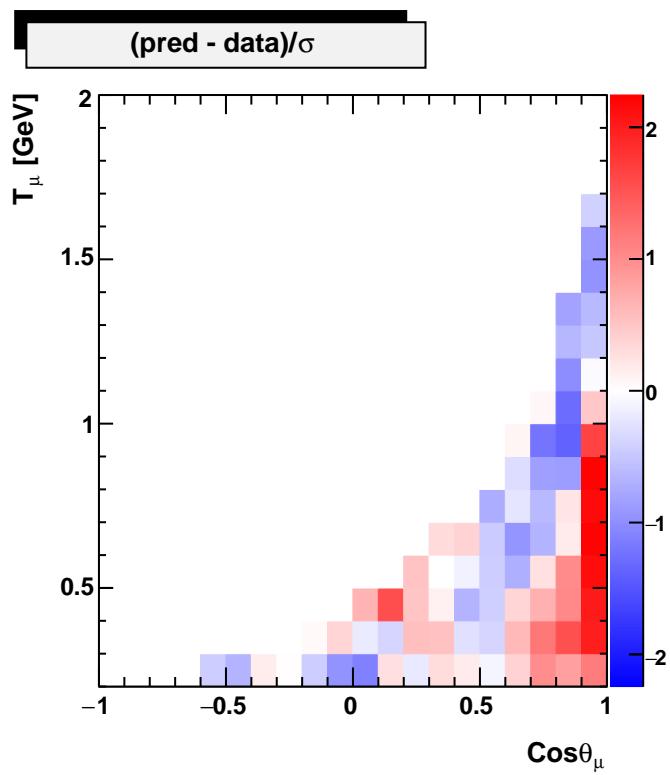
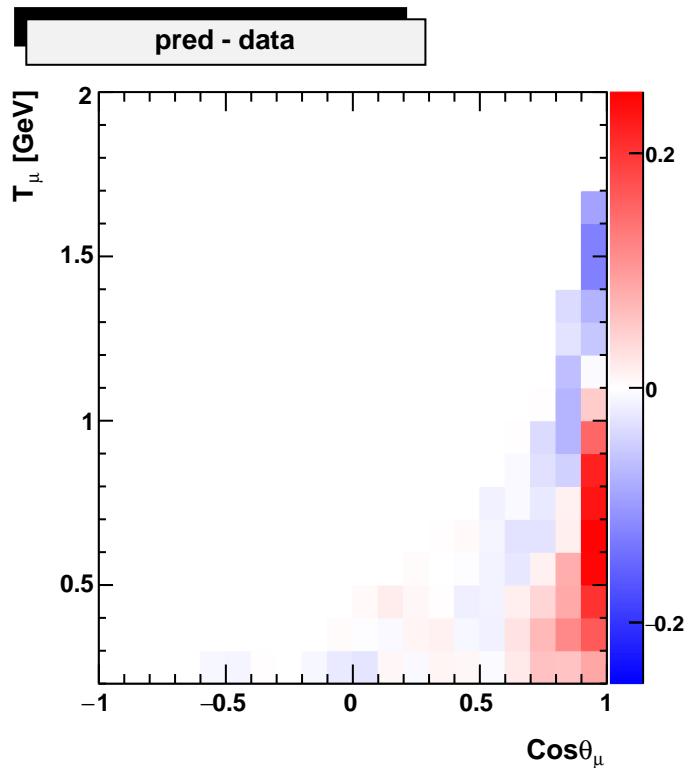
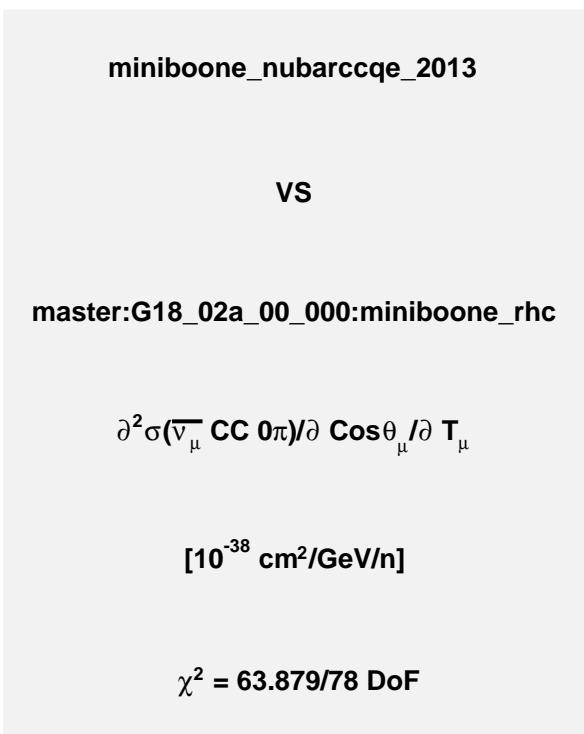
Data: miniboone\_nubarccqe\_2013

© 2003-2018, GENIE - <http://www.genie-mc.org>

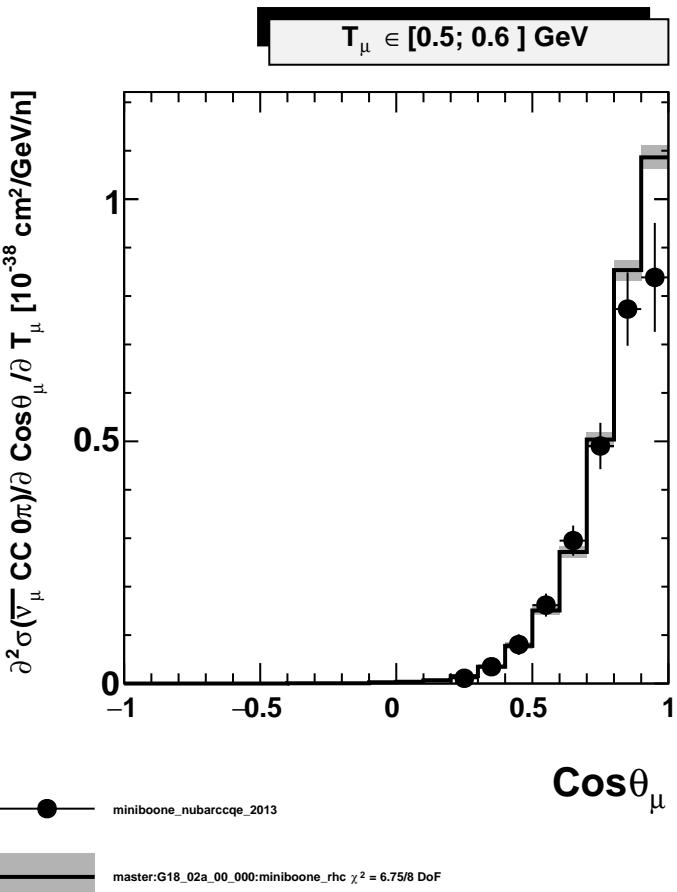
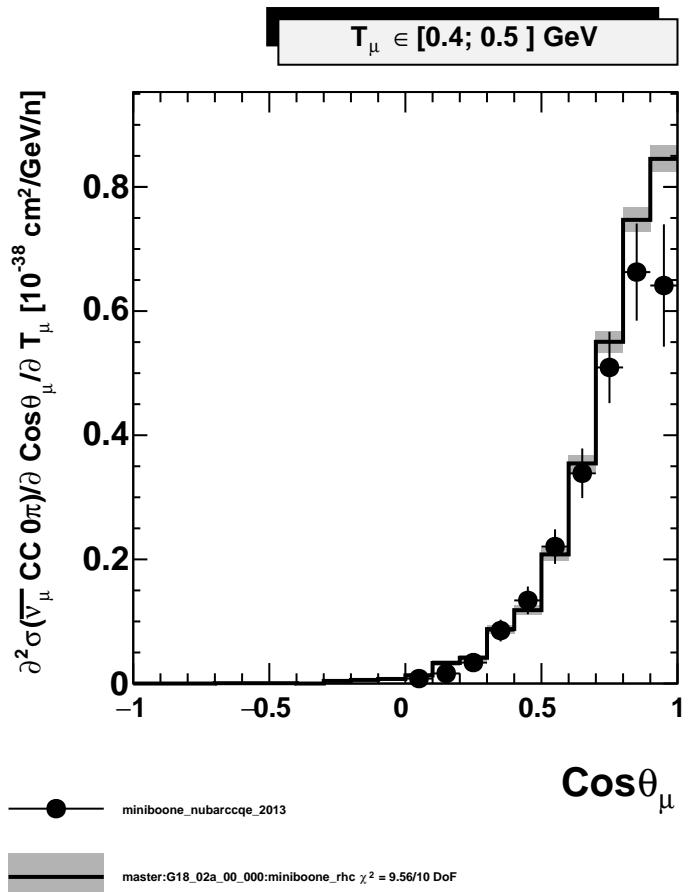
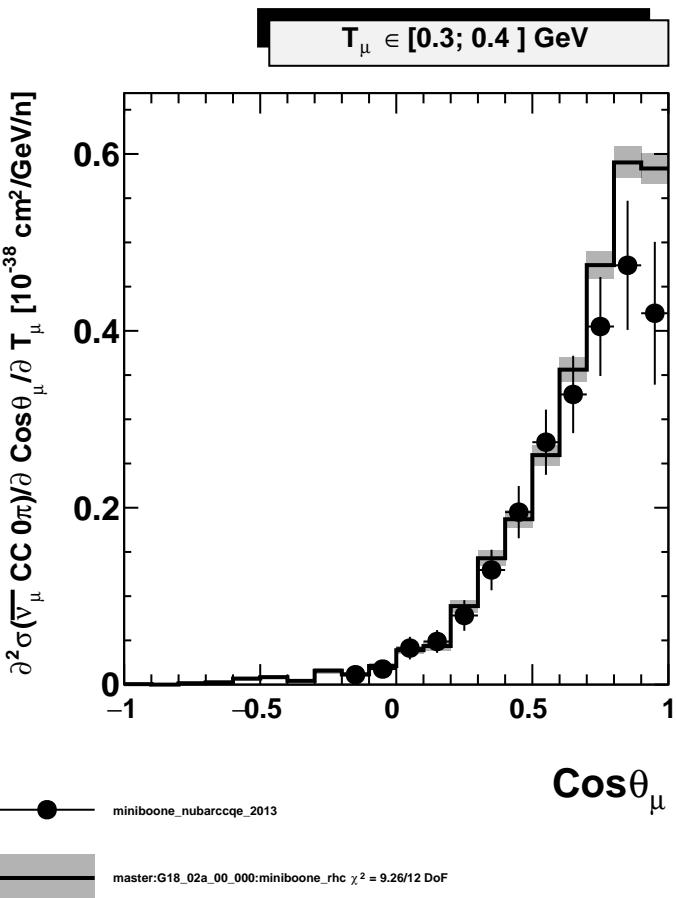
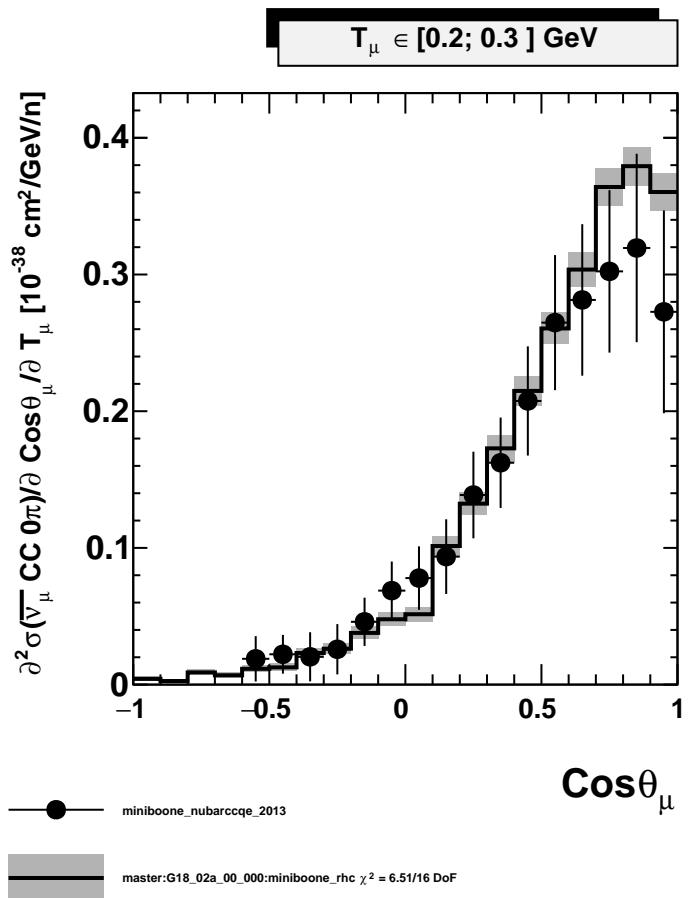


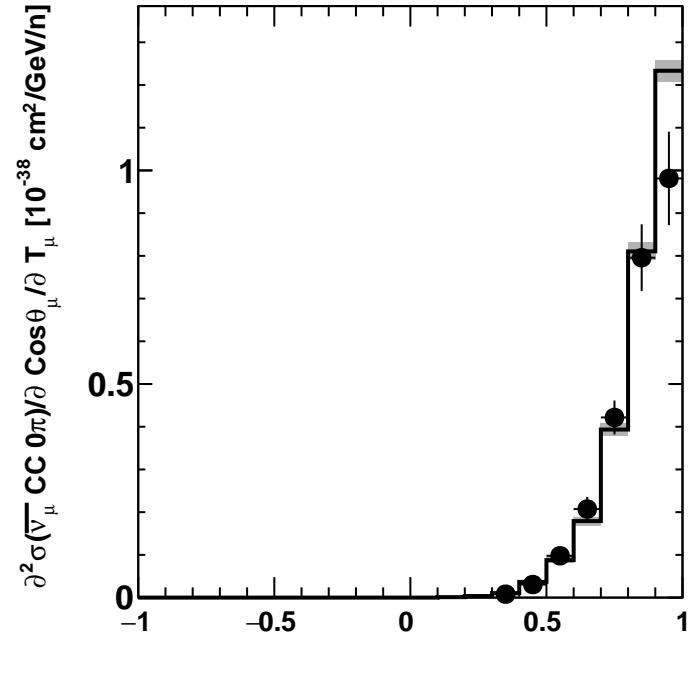
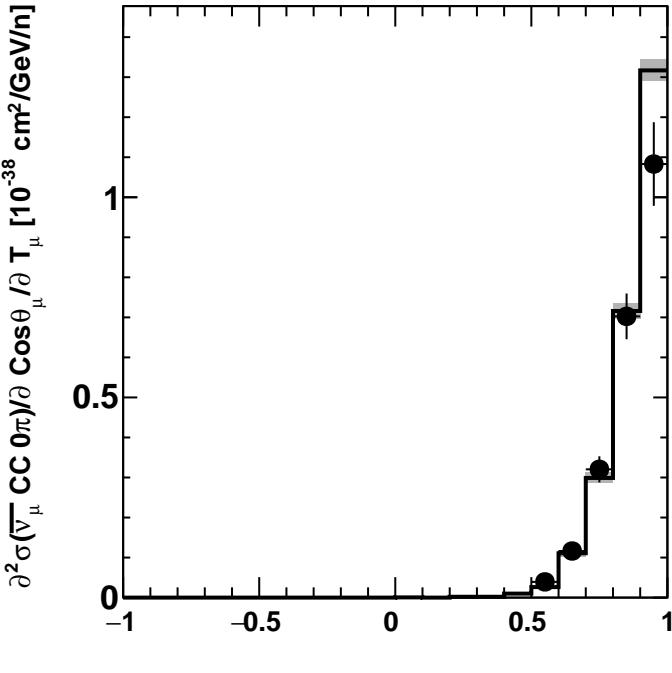
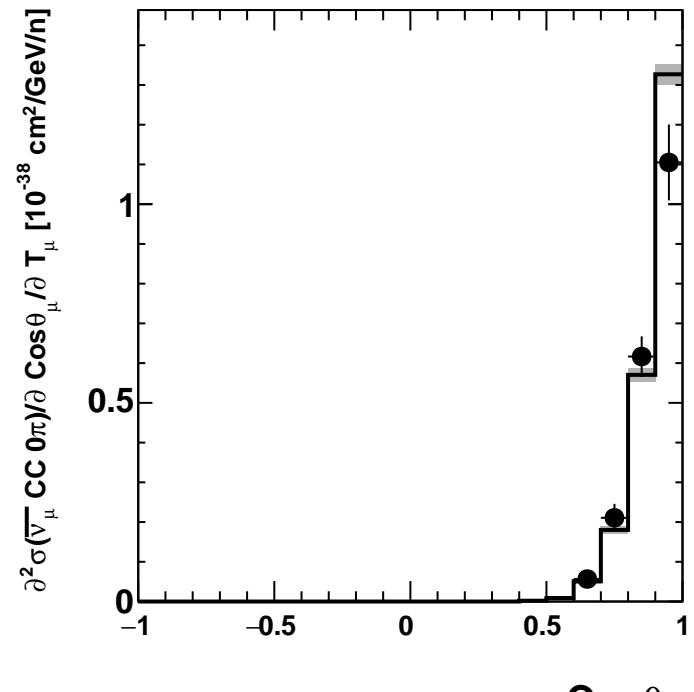
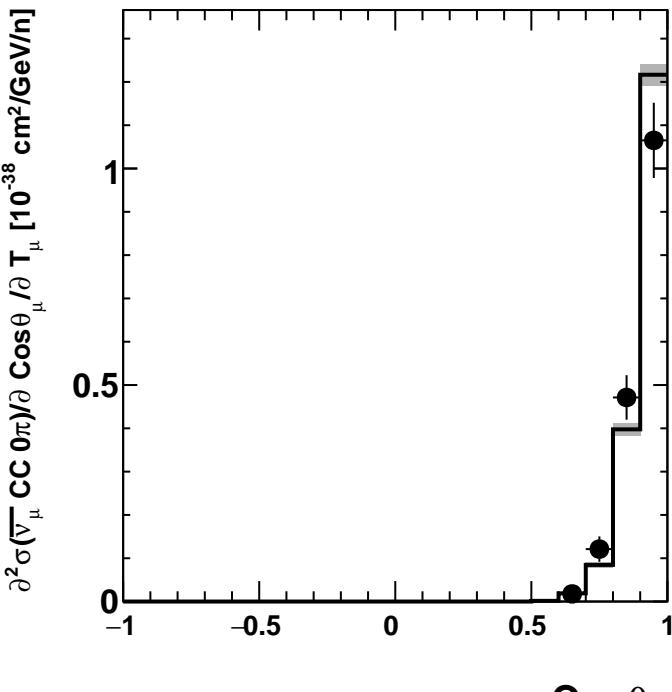
$$\partial^2 \sigma(\bar{\nu}_\mu \text{ CC } 0\pi) / \partial \text{Cos}\theta_\mu / \partial T_\mu [10^{-38} \text{ cm}^2/\text{GeV}/n]$$

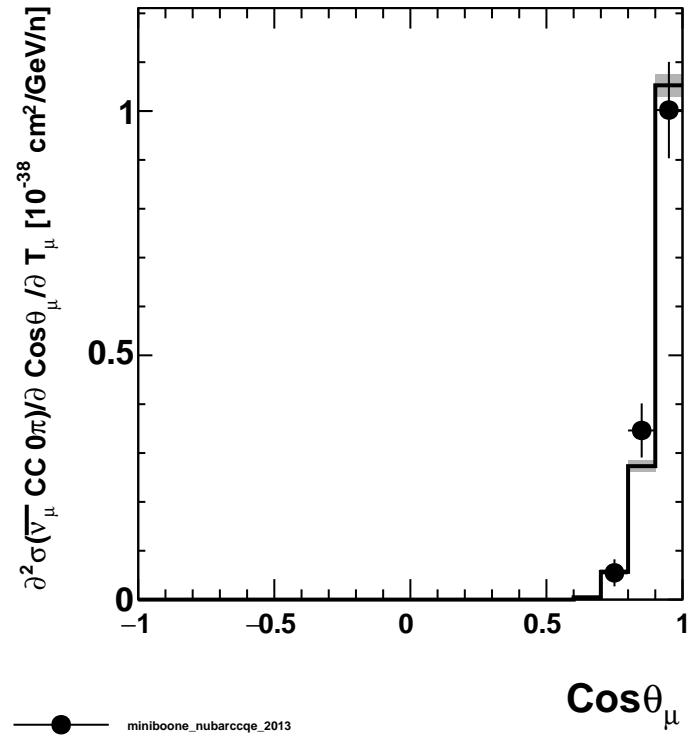
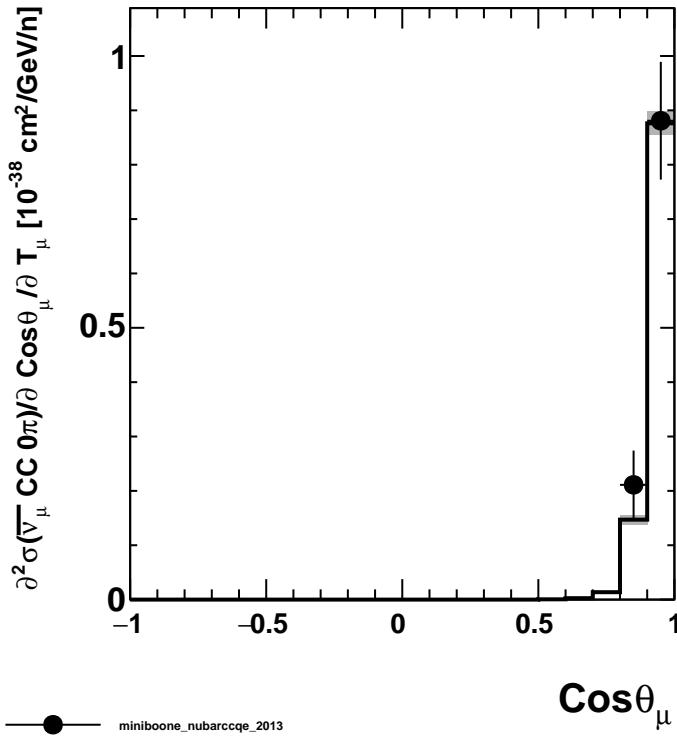
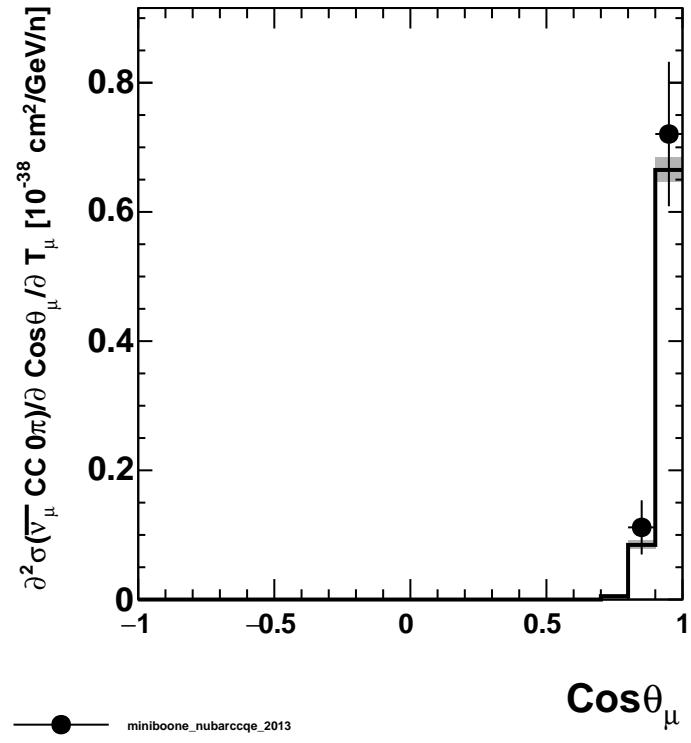
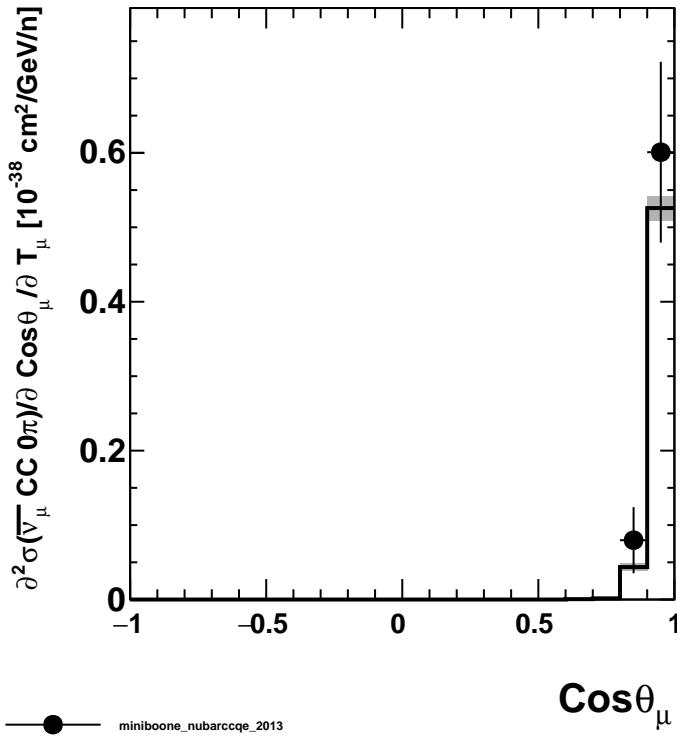
Pred: master:G18\_02a\_00\_000:miniboone\_rhc

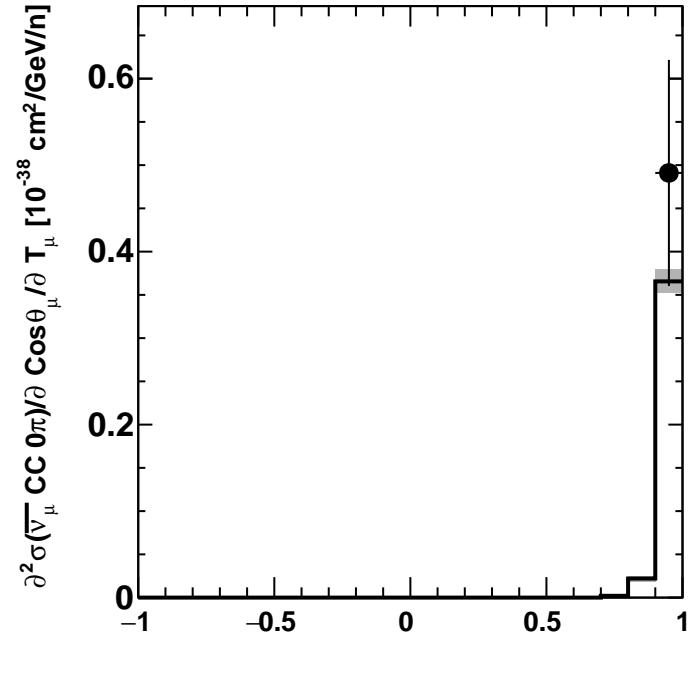
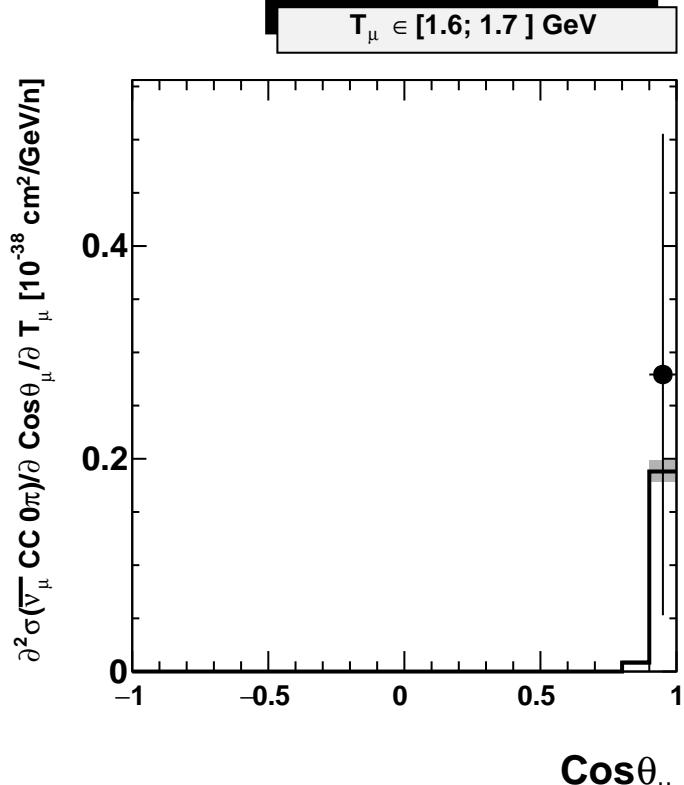
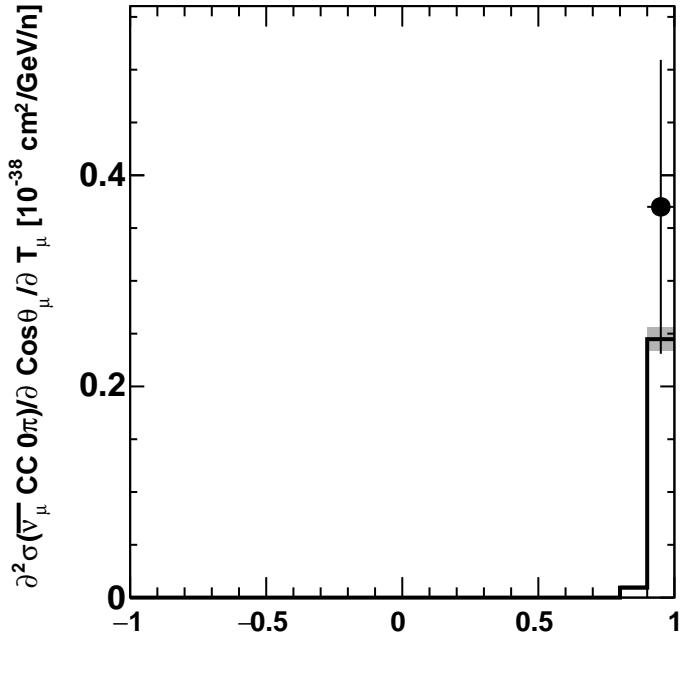
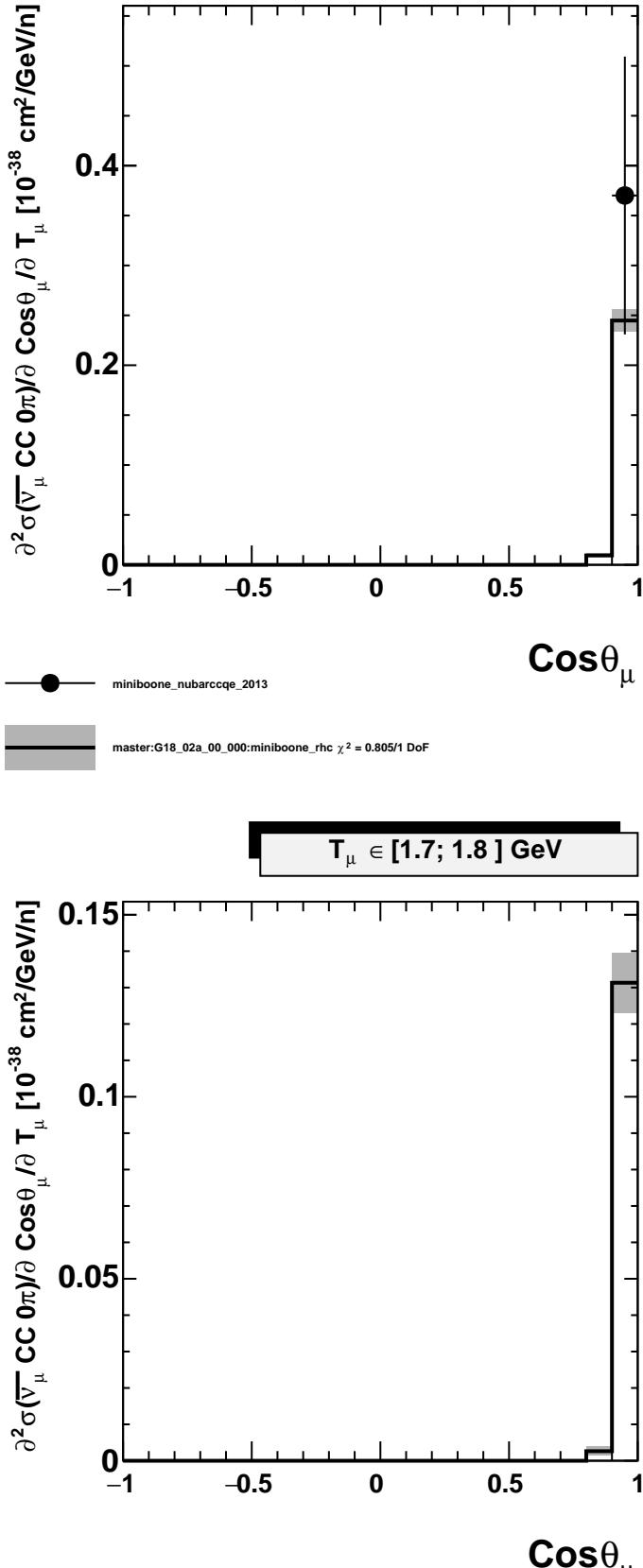


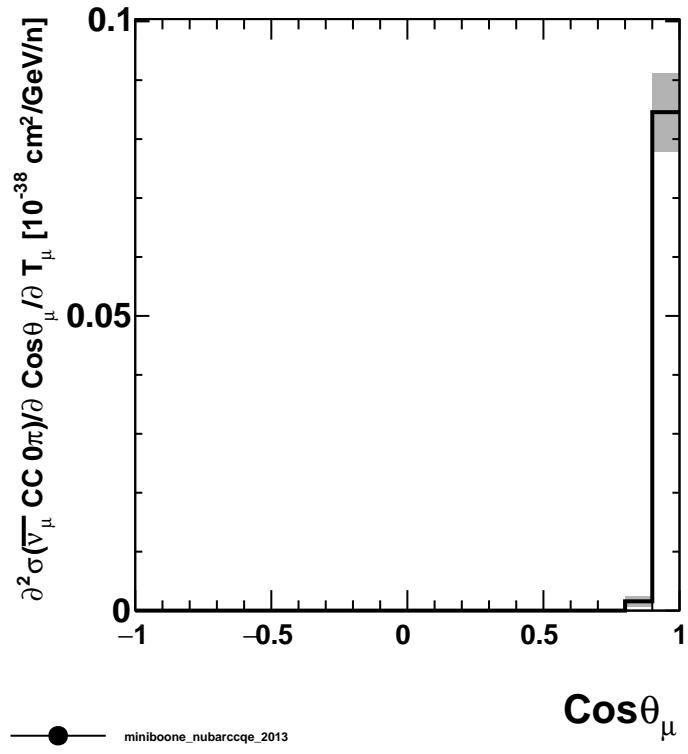
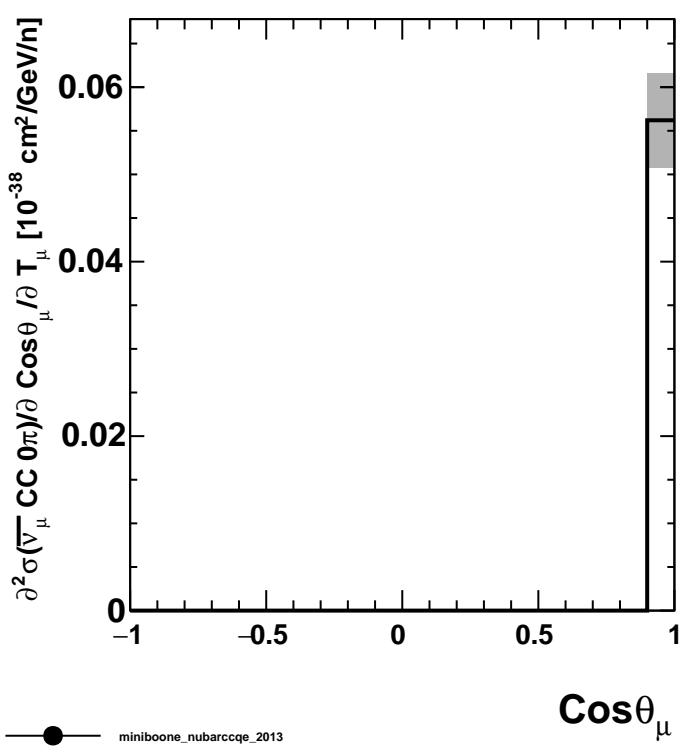




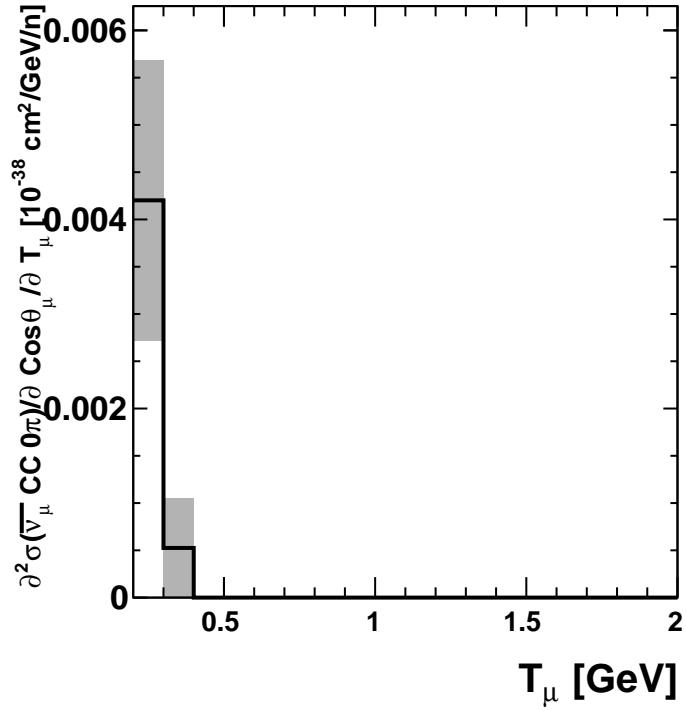
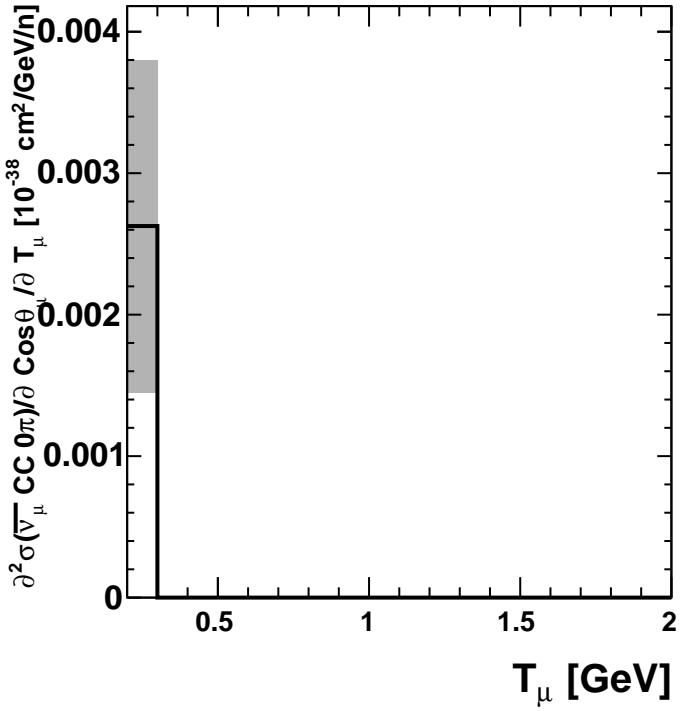
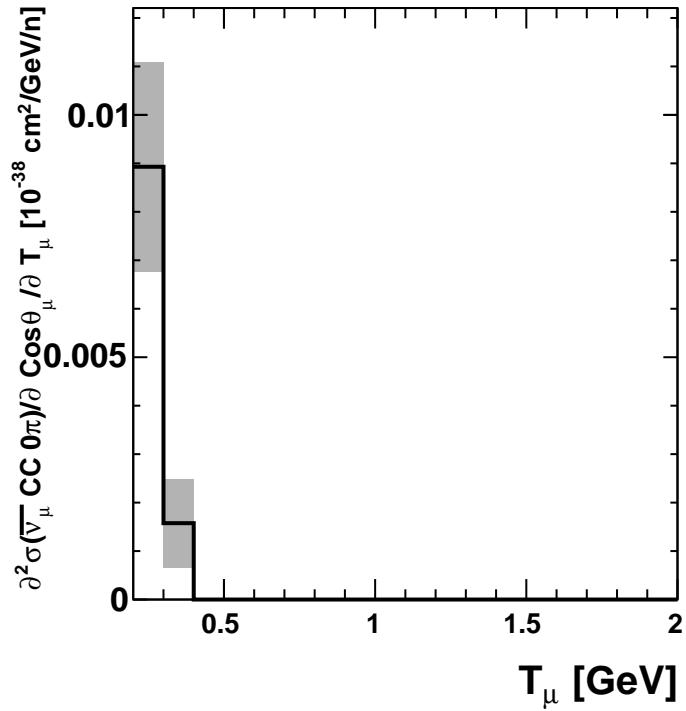
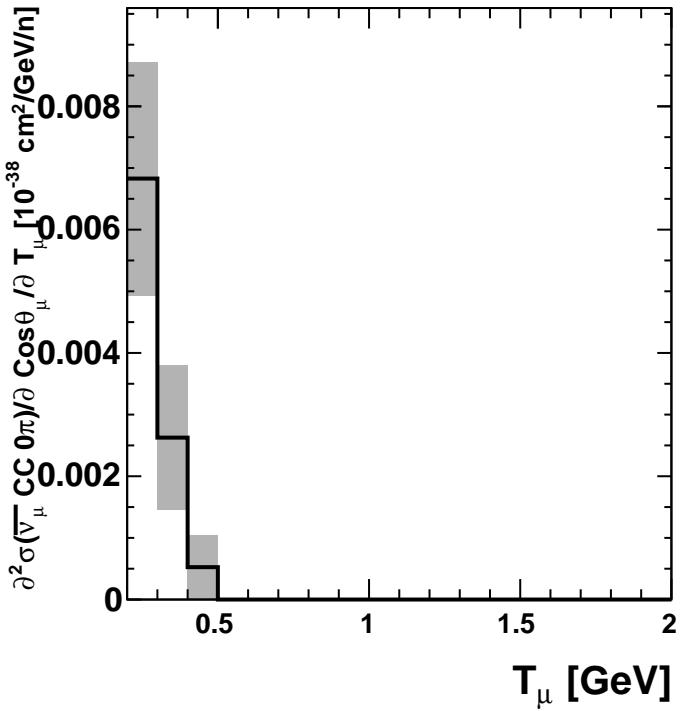
$T_\mu \in [0.6; 0.7] \text{ GeV}$  $T_\mu \in [0.7; 0.8] \text{ GeV}$  $T_\mu \in [0.8; 0.9] \text{ GeV}$  $T_\mu \in [0.9; 1] \text{ GeV}$ 

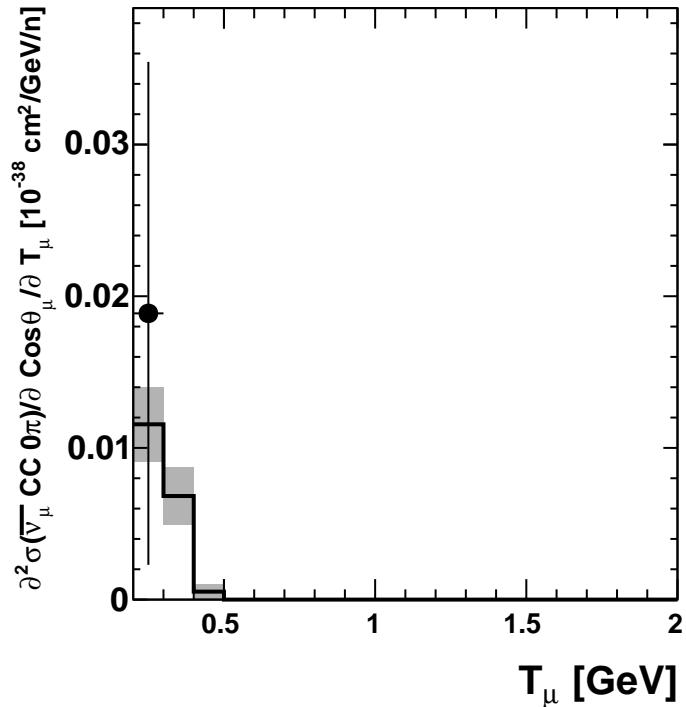
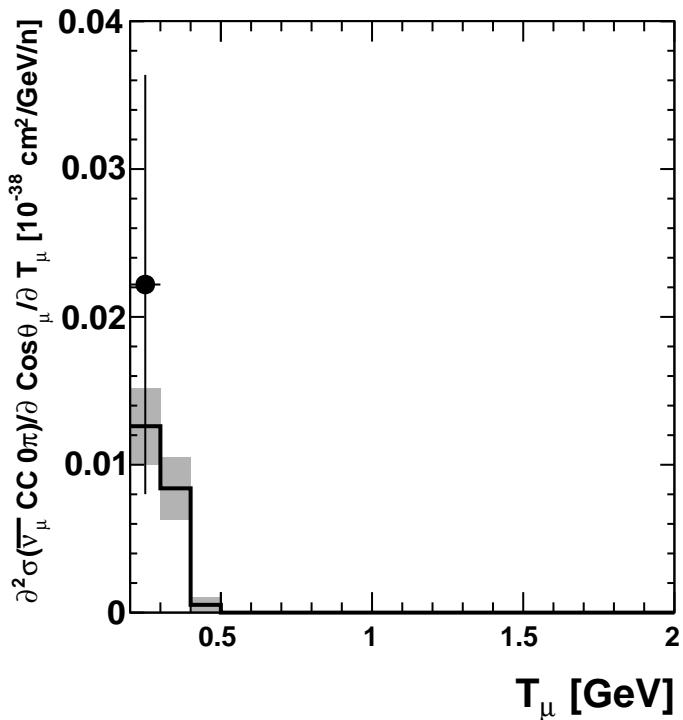
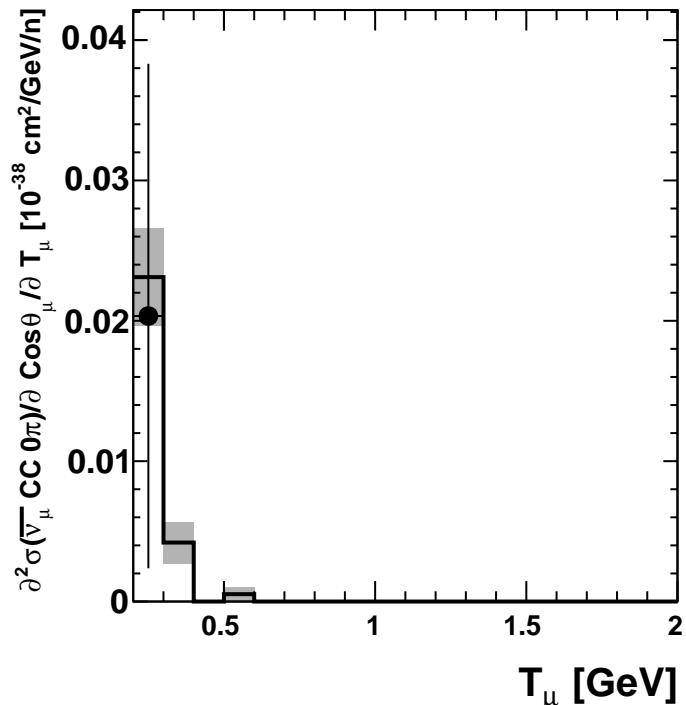
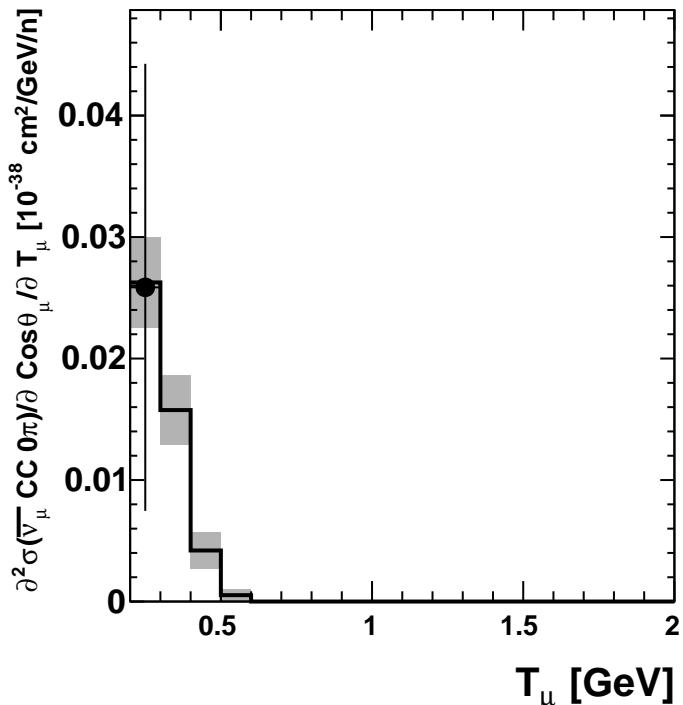
$T_\mu \in [1; 1.1] \text{ GeV}$  $T_\mu \in [1.1; 1.2] \text{ GeV}$  $\cos\theta_\mu$  $\cos\theta_\mu$  $T_\mu \in [1.2; 1.3] \text{ GeV}$  $T_\mu \in [1.3; 1.4] \text{ GeV}$  $\cos\theta_\mu$  $\cos\theta_\mu$

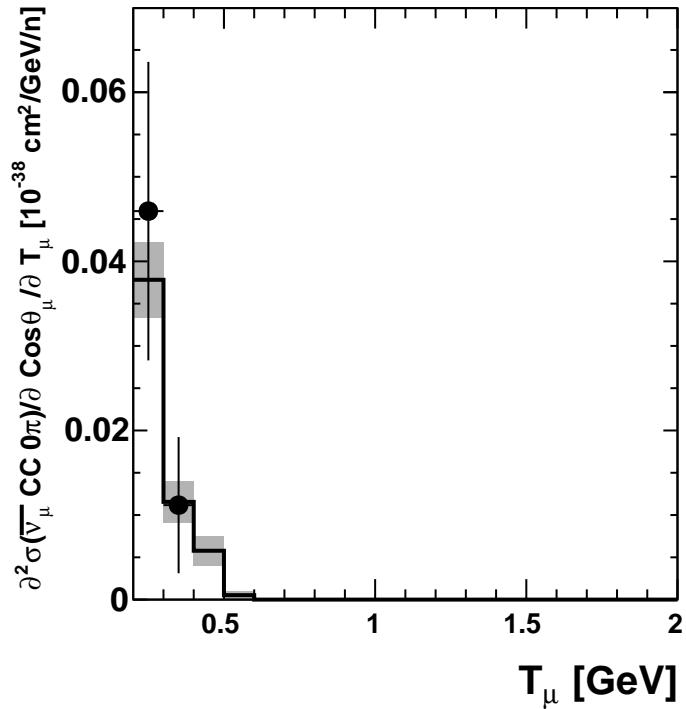
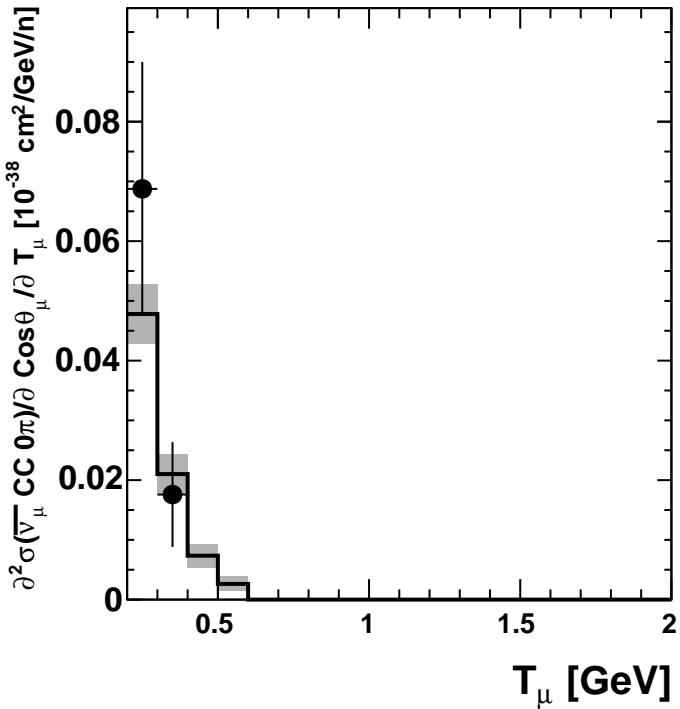
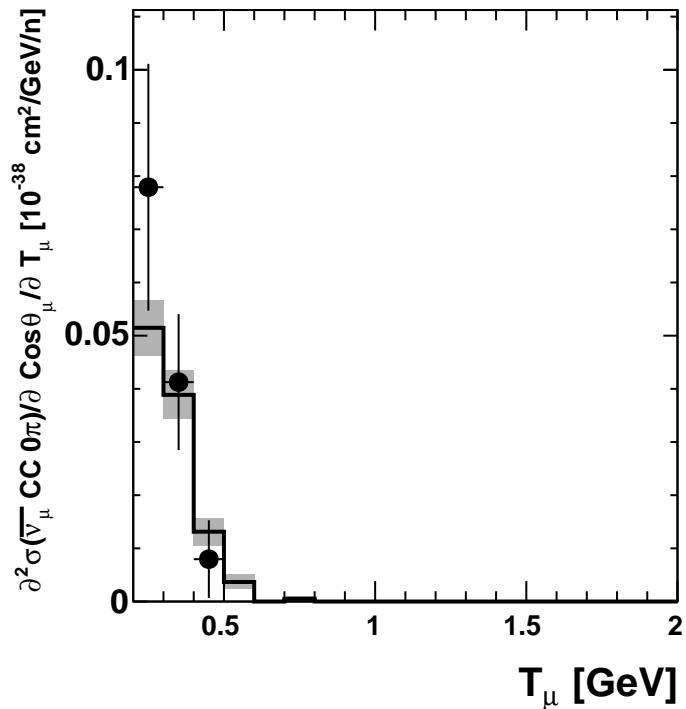
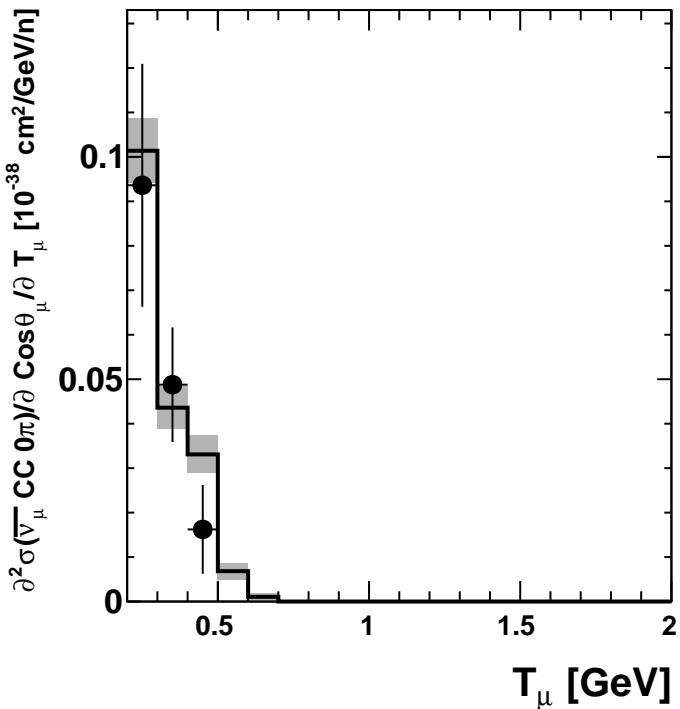
$T_\mu \in [1.4; 1.5] \text{ GeV}$  $T_\mu \in [1.5; 1.6] \text{ GeV}$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$  $\cos\theta_\mu$

$T_\mu \in [1.8; 1.9] \text{ GeV}$  $T_\mu \in [1.9; 2] \text{ GeV}$ 



$\text{Cos}\theta_\mu \in [-1; -0.9]$  $\text{Cos}\theta_\mu \in [-0.9; -0.8]$  $\text{Cos}\theta_\mu \in [-0.8; -0.7]$  $\text{Cos}\theta_\mu \in [-0.7; -0.6]$ 

$\text{Cos}\theta_\mu \in [-0.6; -0.5]$  $\text{Cos}\theta_\mu \in [-0.5; -0.4]$  $\text{Cos}\theta_\mu \in [-0.4; -0.3]$  $\text{Cos}\theta_\mu \in [-0.3; -0.2]$ 

$\text{Cos}\theta_\mu \in [-0.2; -0.1]$  $\text{Cos}\theta_\mu \in [-0.1; 0]$  $\text{Cos}\theta_\mu \in [0; 0.1]$  $\text{Cos}\theta_\mu \in [0.1; 0.2]$ 

miniboone\_nubarccqe\_2013

master:G18\_02a\_00\_000:miniboone\_rhc  $\chi^2 = 0.201/2$  DoF

miniboone\_nubarccqe\_2013

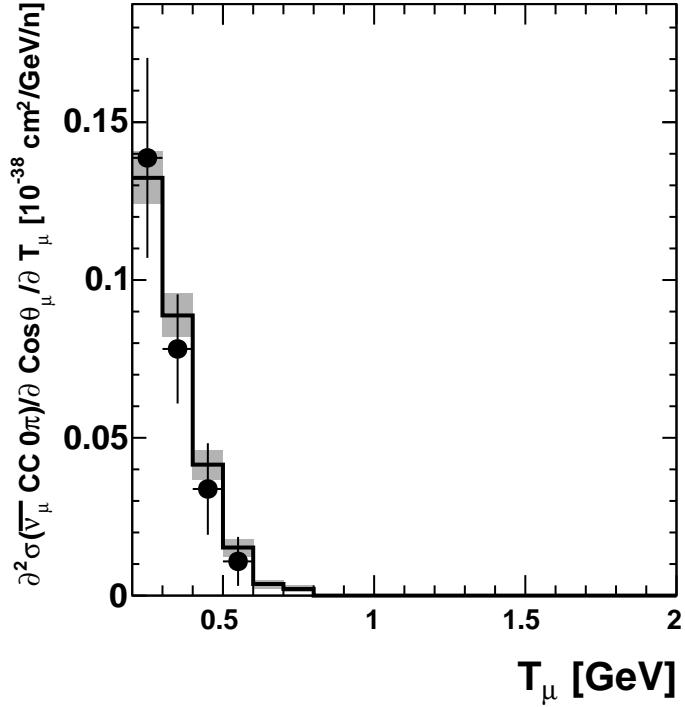
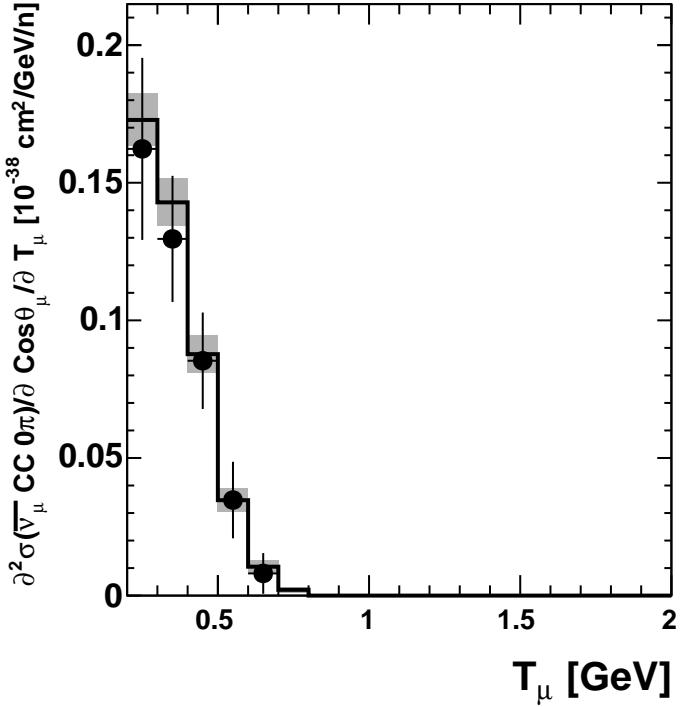
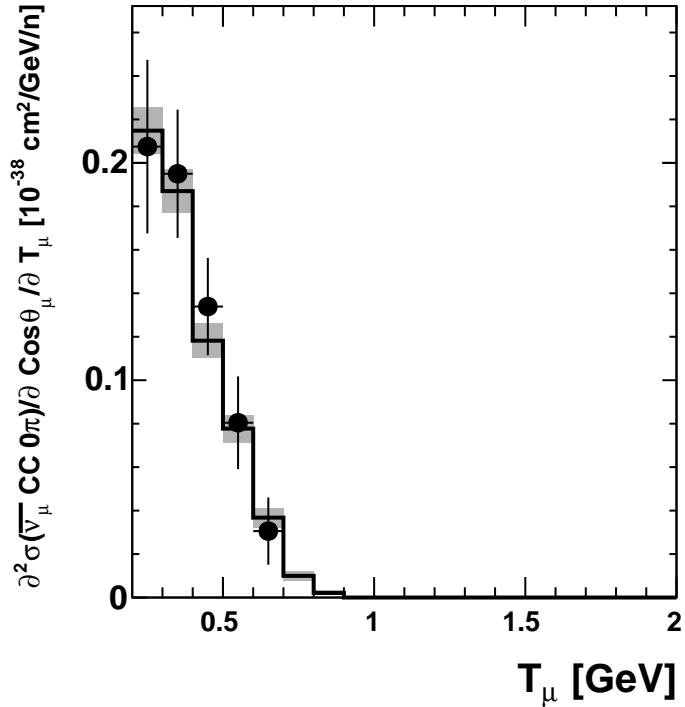
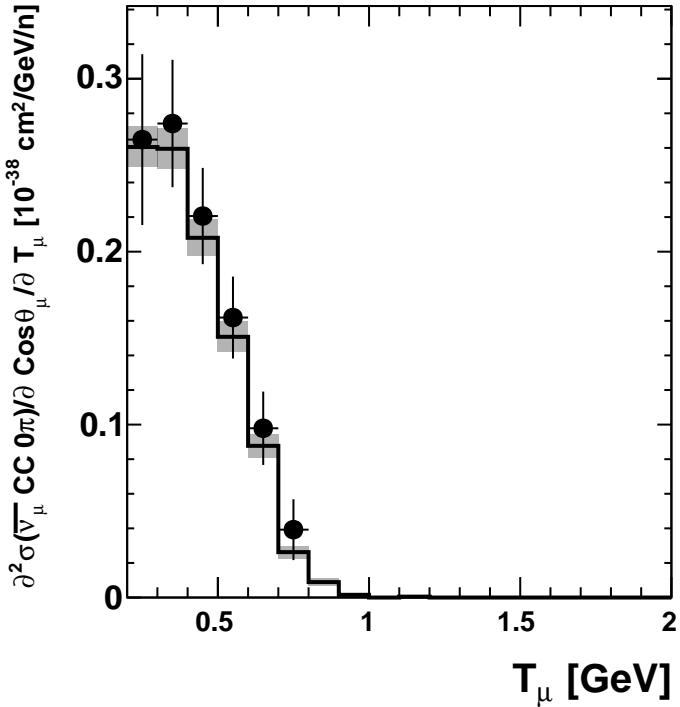
master:G18\_02a\_00\_000:miniboone\_rhc  $\chi^2 = 1.05/2$  DoF

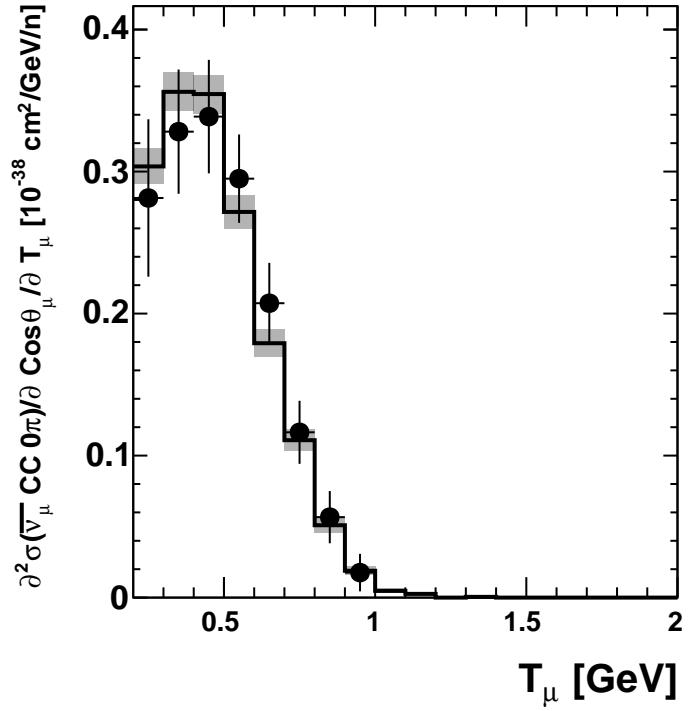
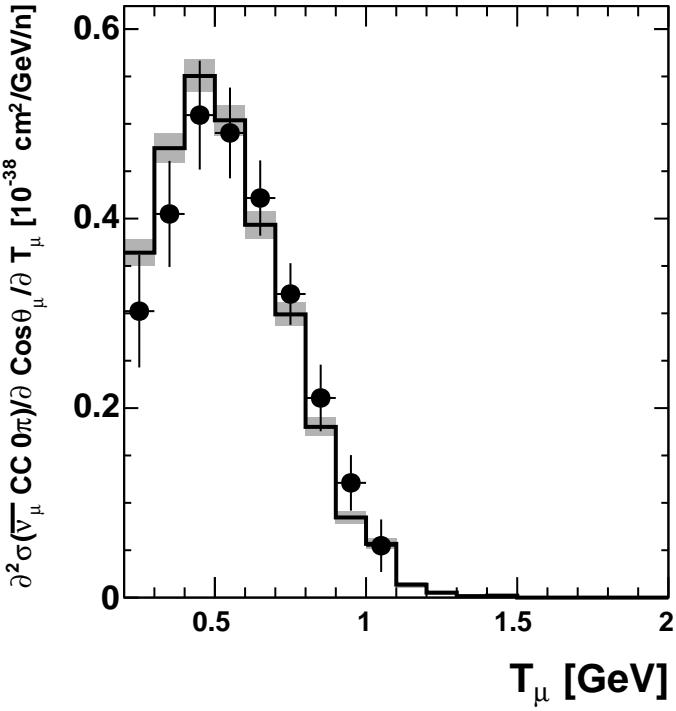
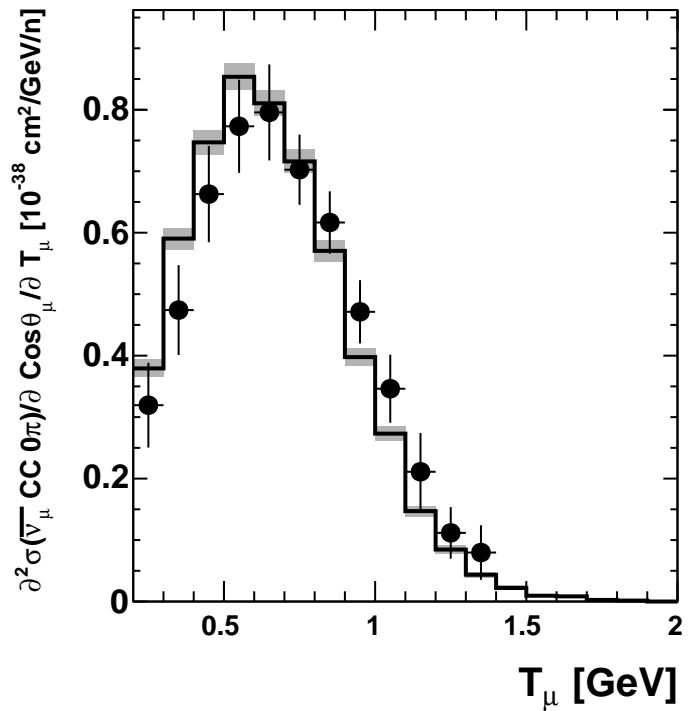
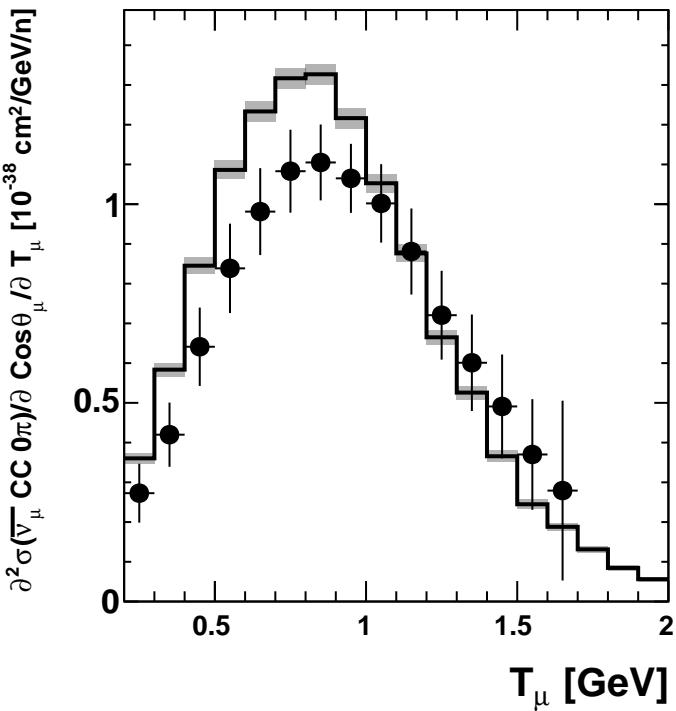
miniboone\_nubarccqe\_2013

master:G18\_02a\_00\_000:miniboone\_rhc  $\chi^2 = 1.71/3$  DoF

miniboone\_nubarccqe\_2013

master:G18\_02a\_00\_000:miniboone\_rhc  $\chi^2 = 2.65/3$  DoF

$\text{Cos}\theta_\mu \in [0.2; 0.3]$  $\text{Cos}\theta_\mu \in [0.3; 0.4]$  $\text{Cos}\theta_\mu \in [0.4; 0.5]$  $\text{Cos}\theta_\mu \in [0.5; 0.6]$ 

$\text{Cos}\theta_\mu \in [0.6; 0.7]$  $\text{Cos}\theta_\mu \in [0.7; 0.8]$  $\text{Cos}\theta_\mu \in [0.8; 0.9]$  $\text{Cos}\theta_\mu \in [0.9; 1]$ 



**Dataset:**

**t2k\_nd280\_numucc0pi\_2015\_rps**

**Model:**

**master/G18\_02a\_00\_000  $\chi^2 = 79.3 / 80$  DoF**

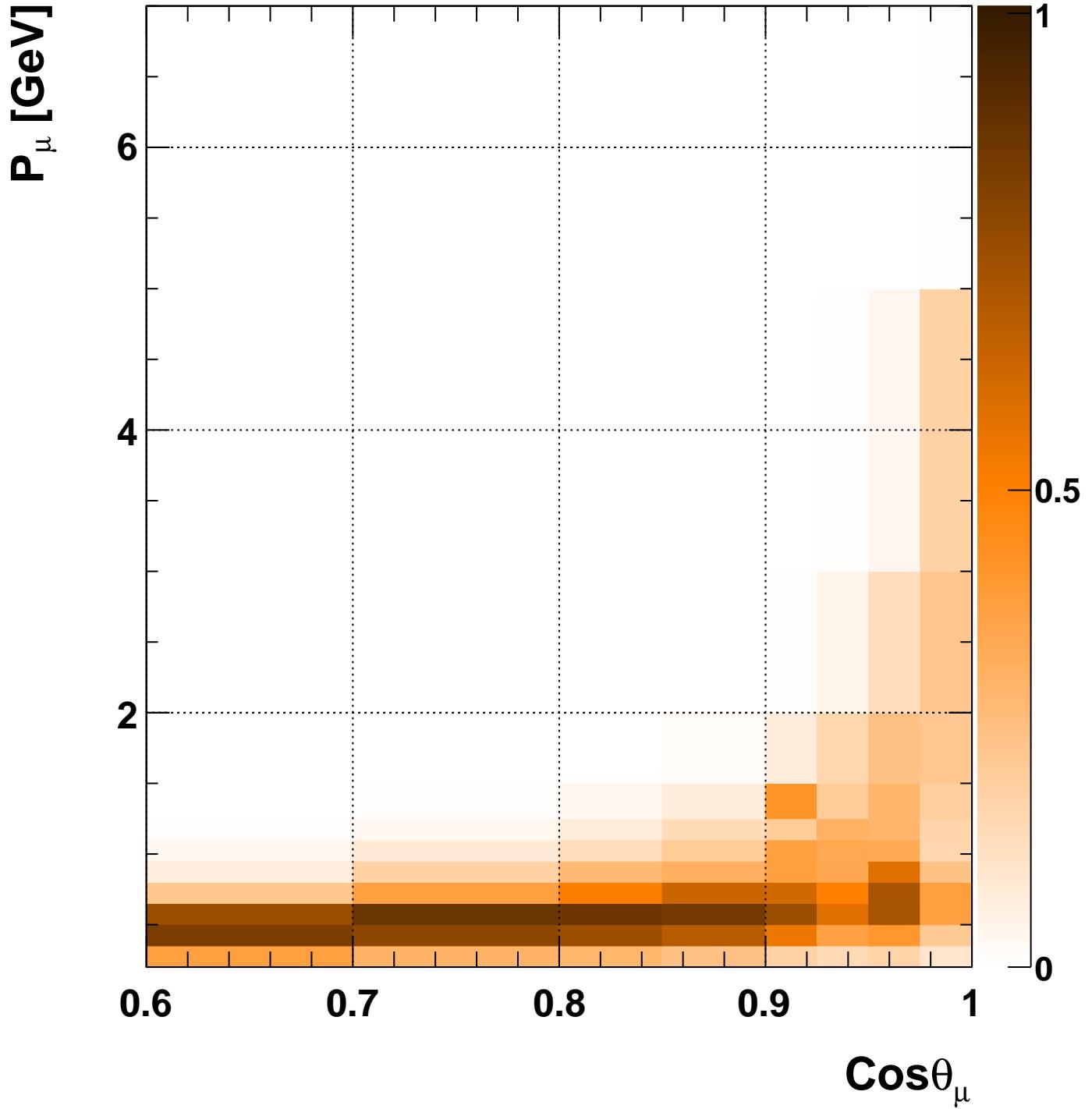
**Plot:**

$\partial^2 \sigma / \partial \cos\theta_\mu / \partial P_\mu$

**80 DoF,  $\chi^2 = 79.3$**

**2018/10/15 09:40:43**

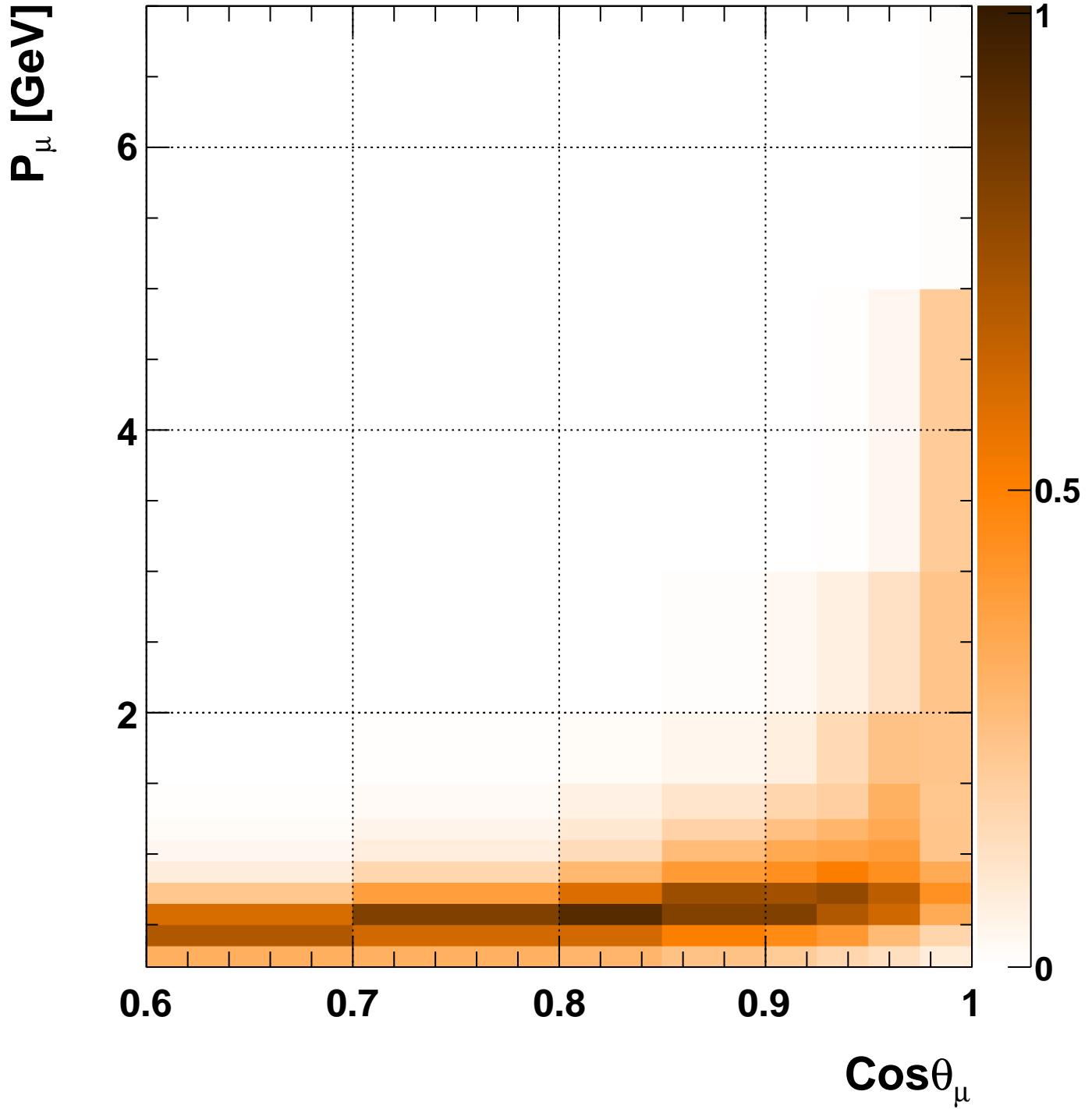
© 2003-2018, GENIE - <http://www.genie-mc.org>



$\partial^2\sigma/\partial \text{Cos}\theta_\mu/\partial P_\mu$  [ $10^{-38} \text{ cm}^2/\text{GeV}/n$ ]

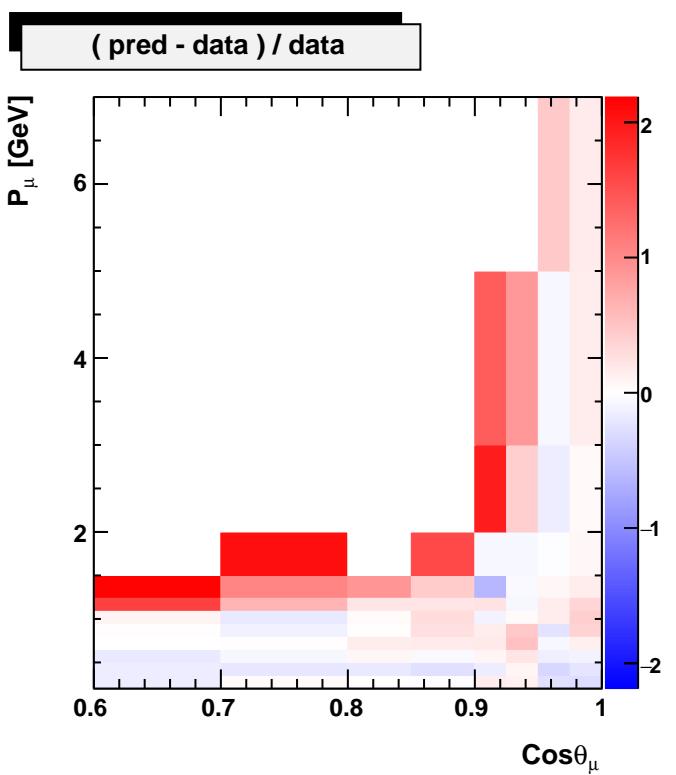
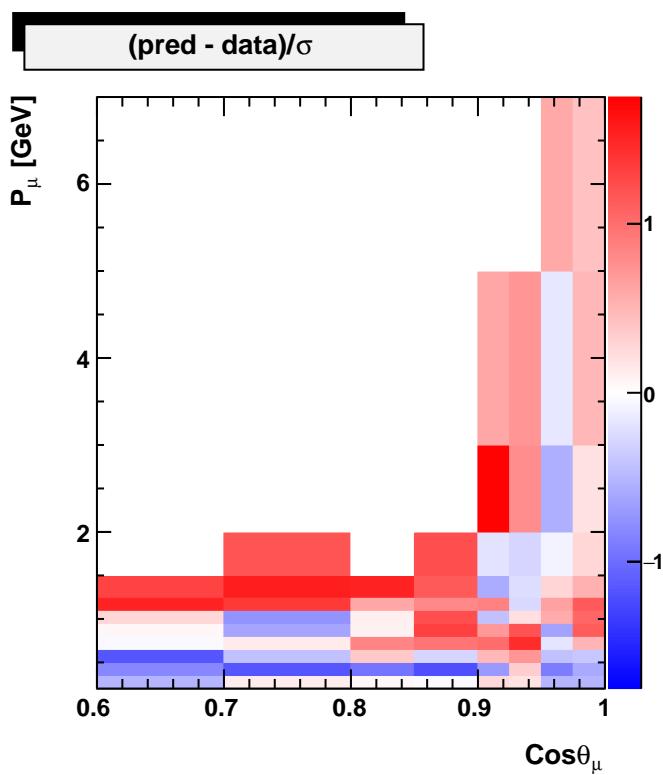
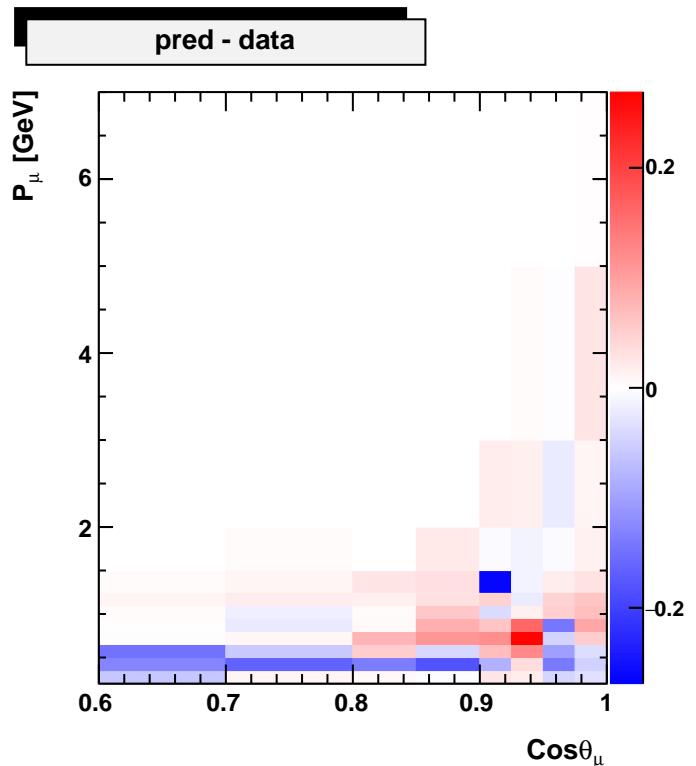
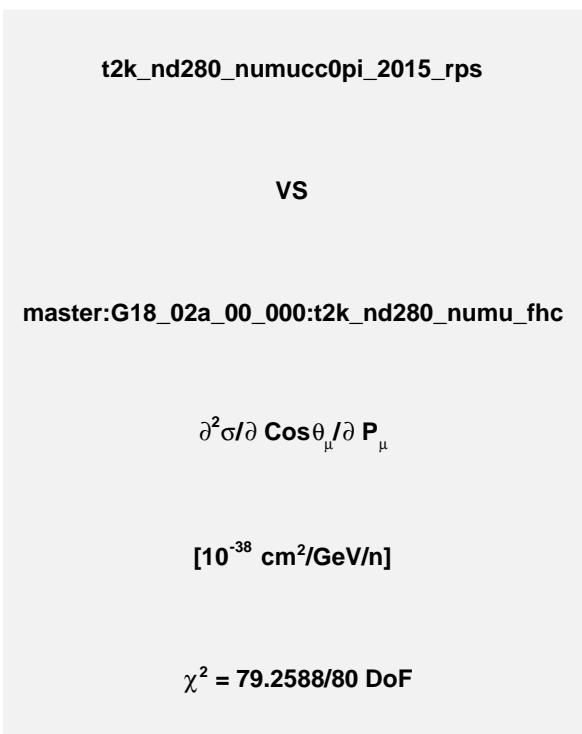
Data: t2k\_nd280\_numucc0pi\_2015\_rps

© 2003-2018, GENIE - <http://www.genie-mc.org>

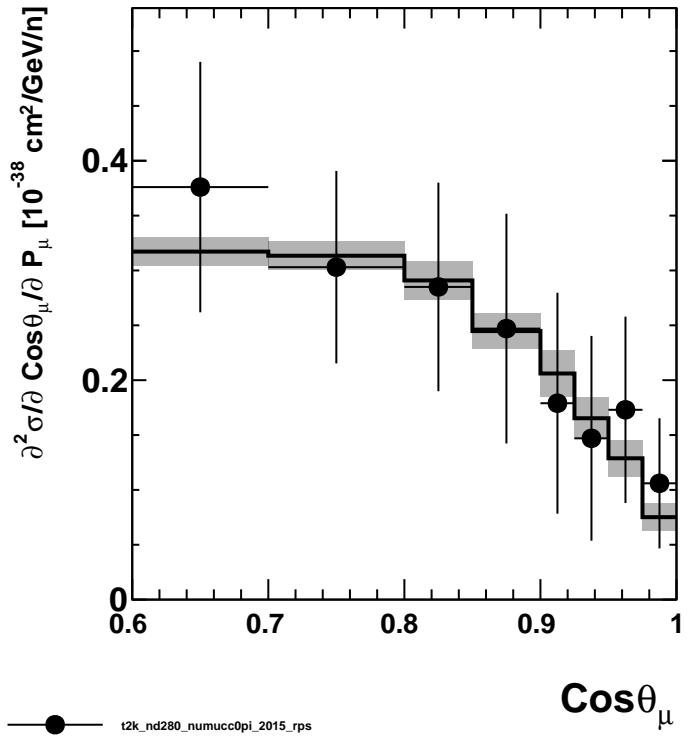
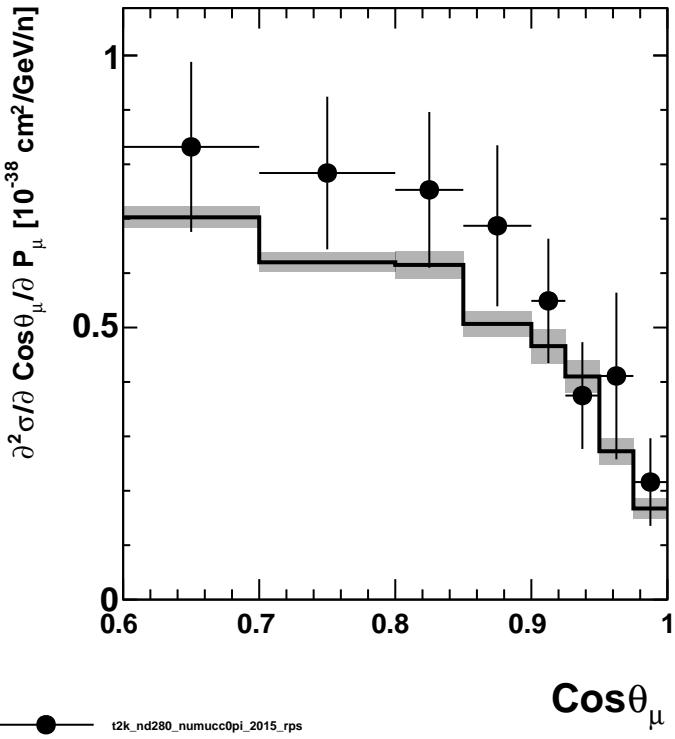
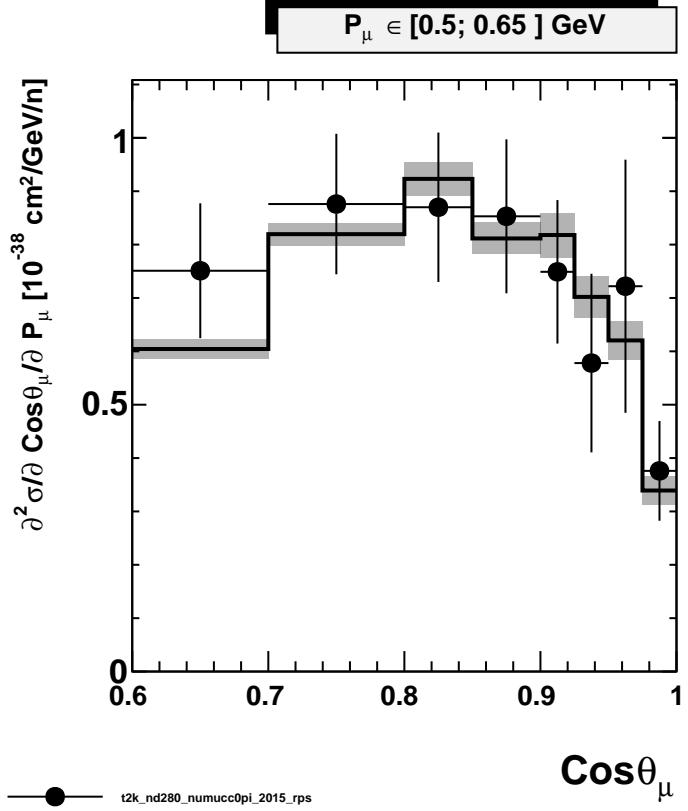
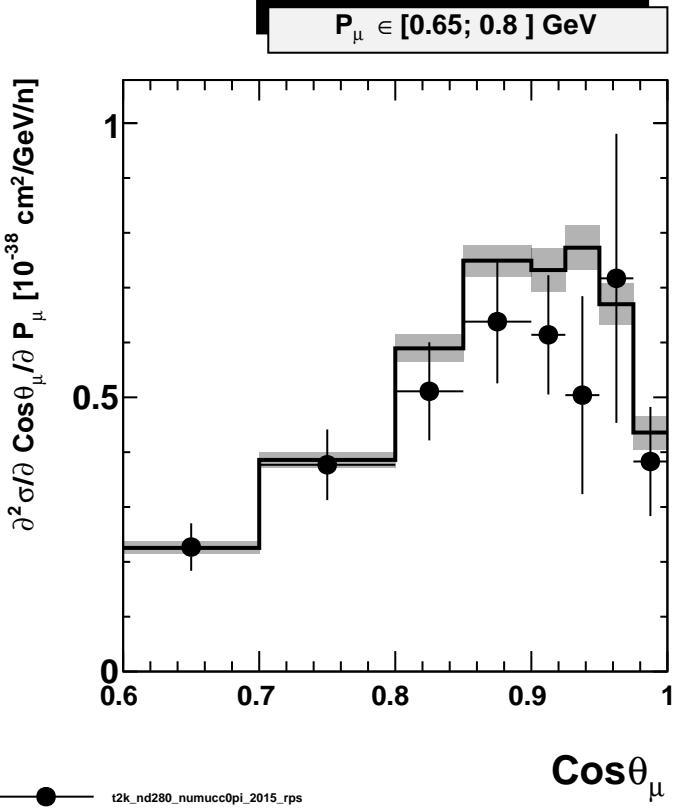


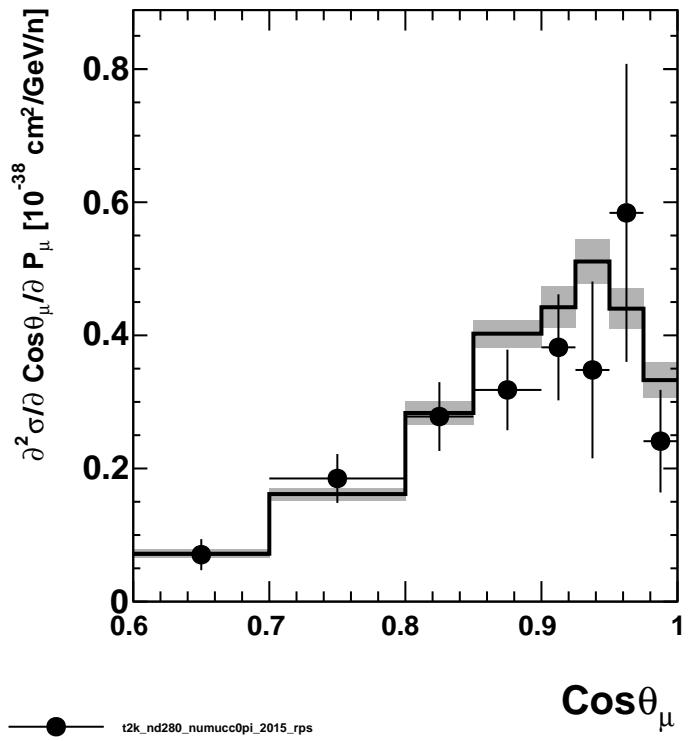
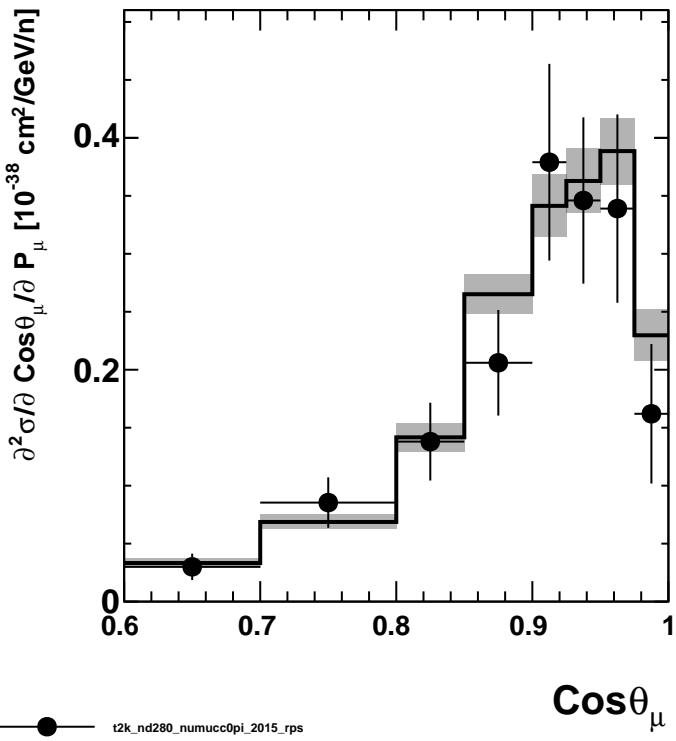
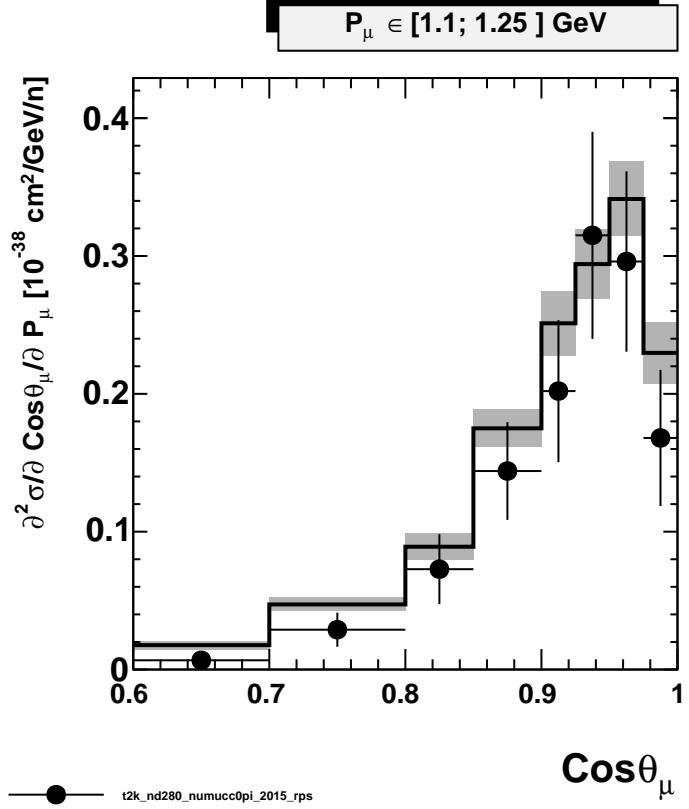
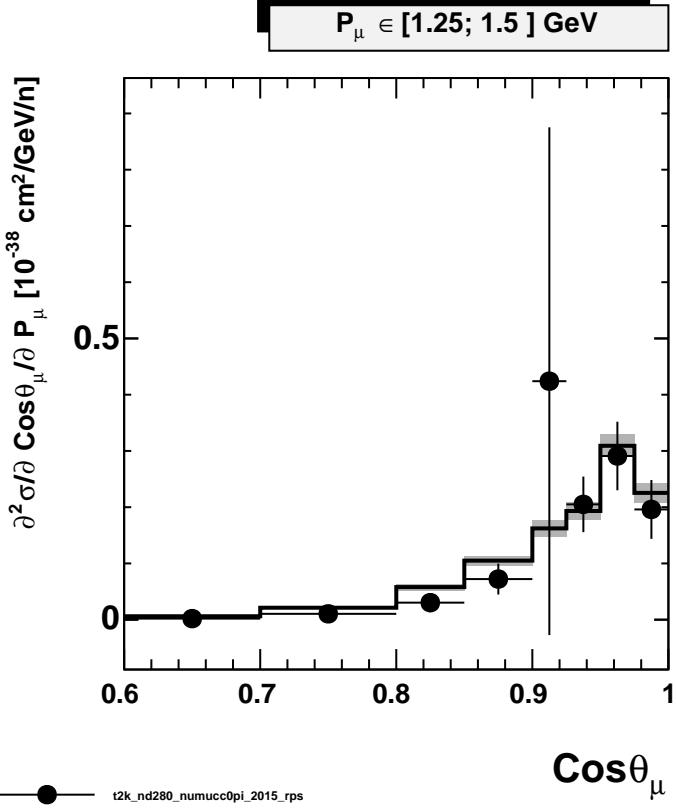
$$\partial^2\sigma/\partial \text{Cos}\theta_\mu / \partial P_\mu [10^{-38} \text{ cm}^2/\text{GeV}/n]$$

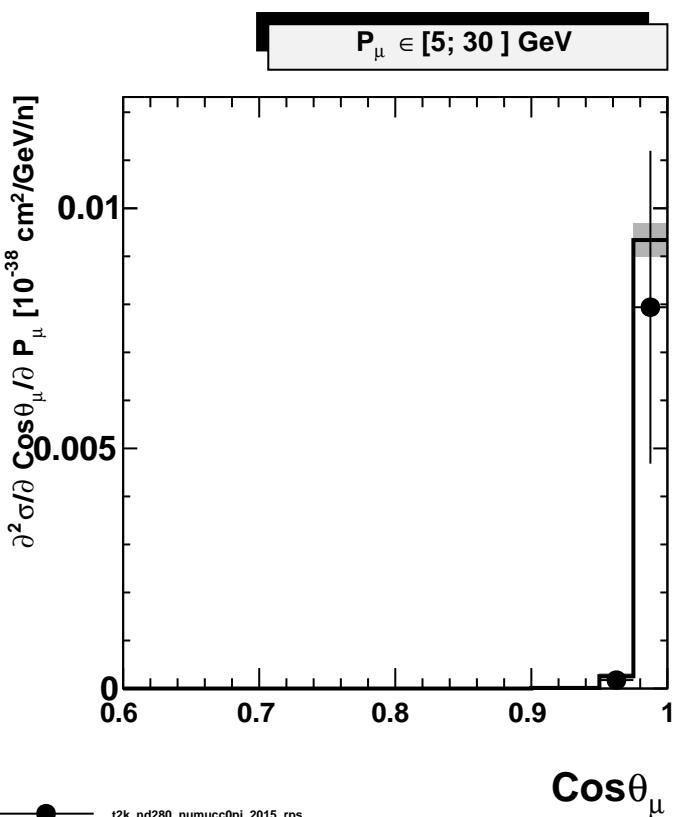
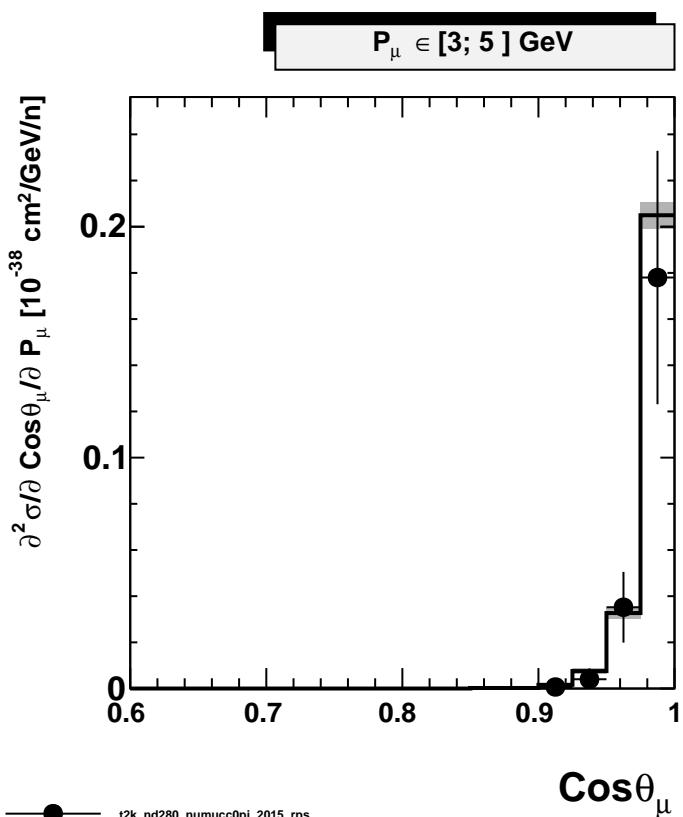
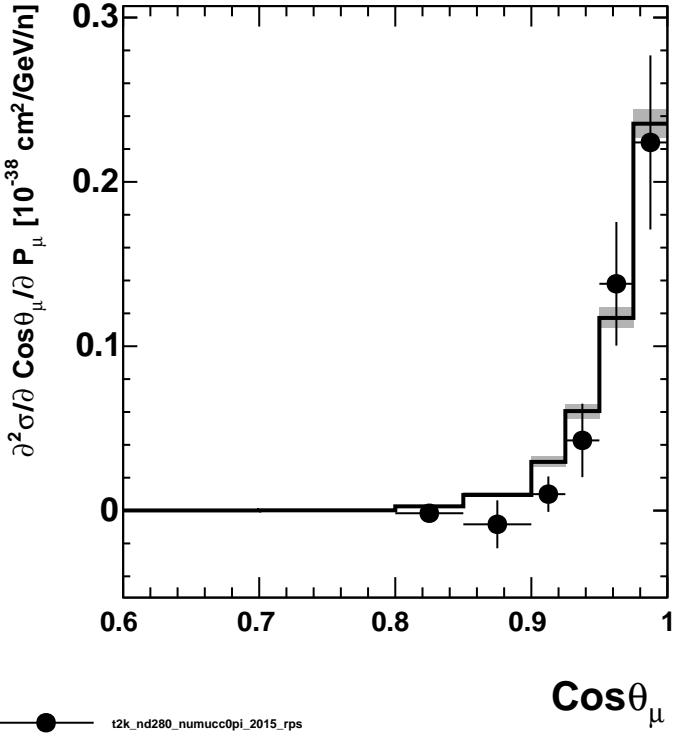
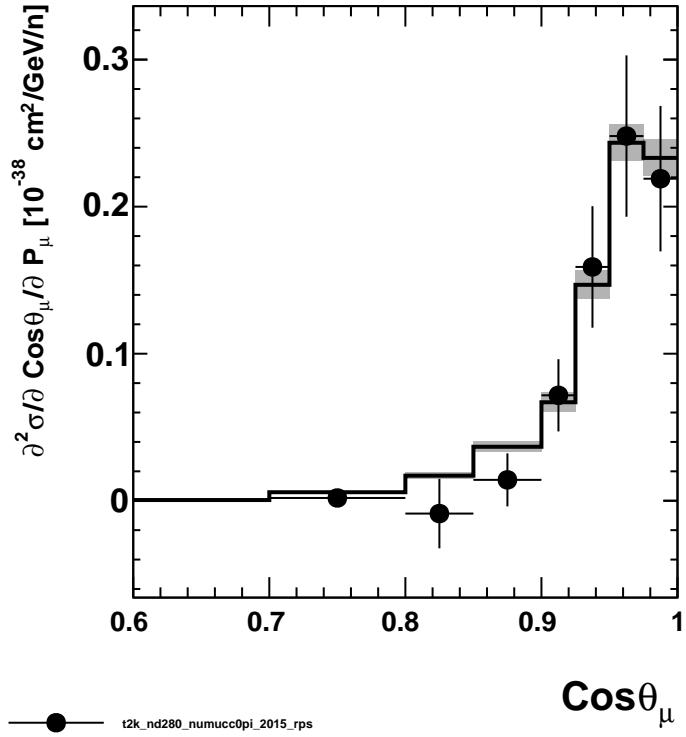
Pred: master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc



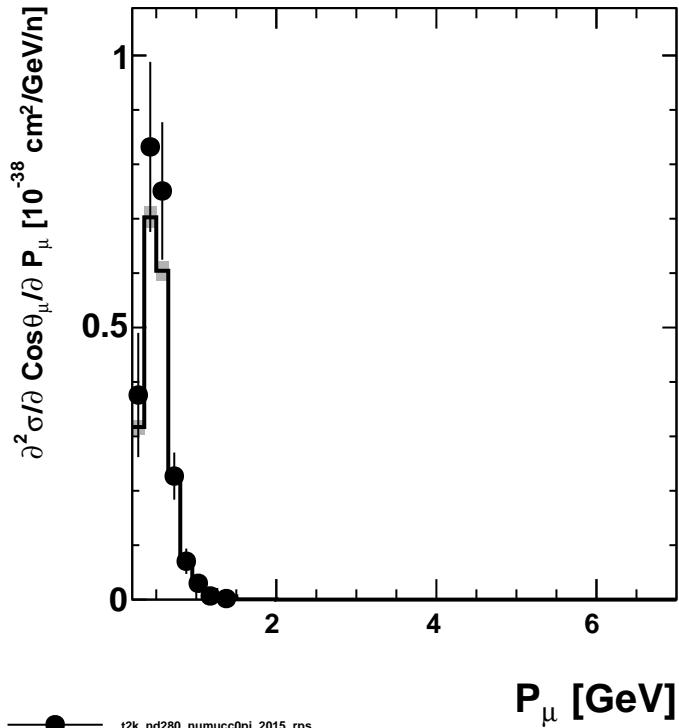
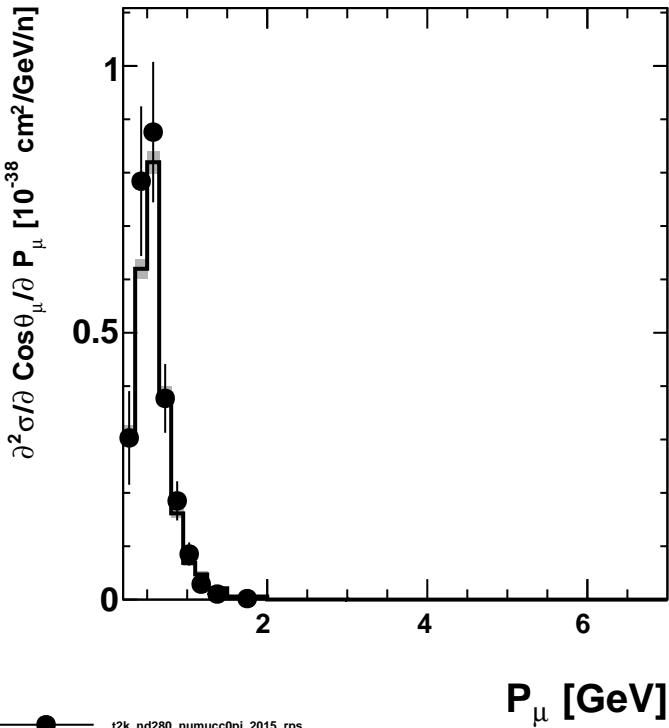
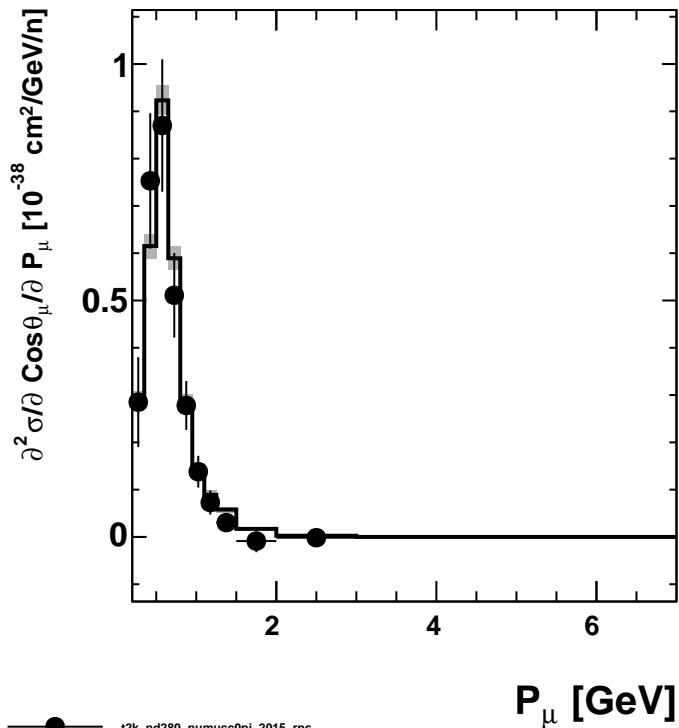
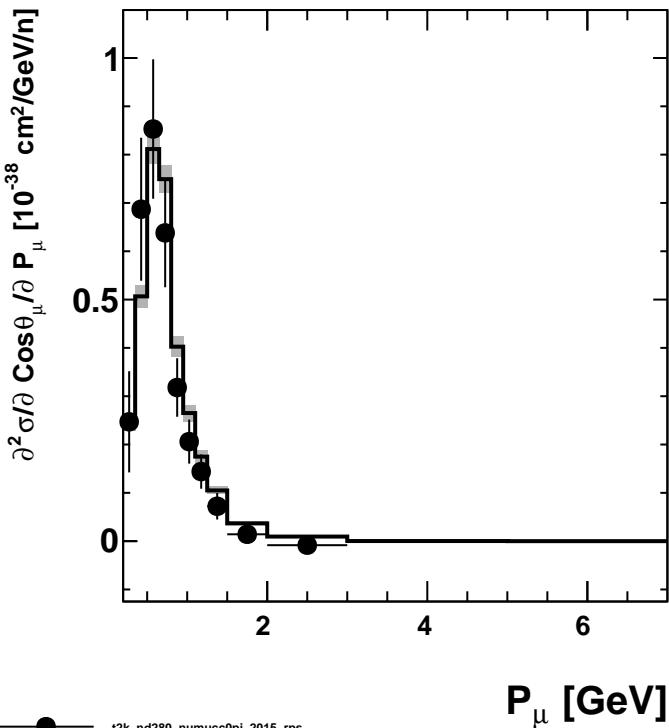


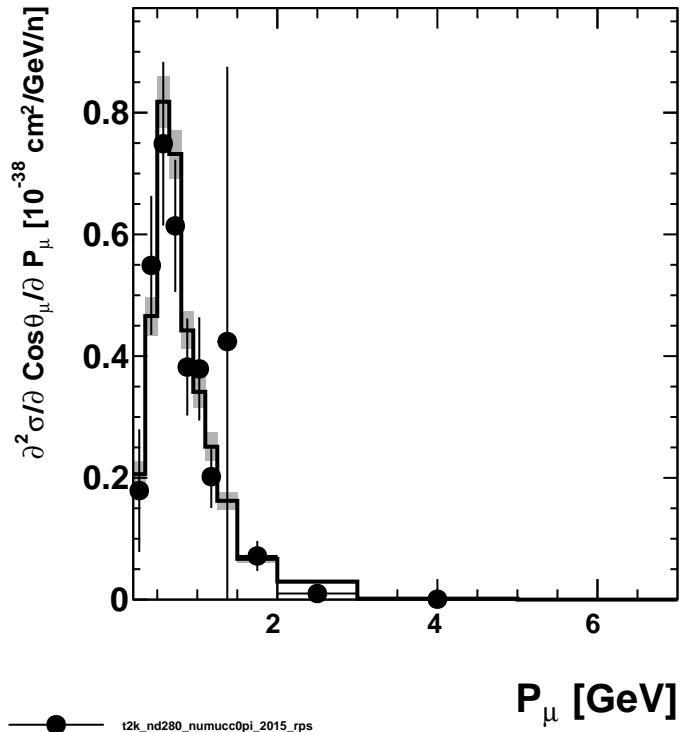
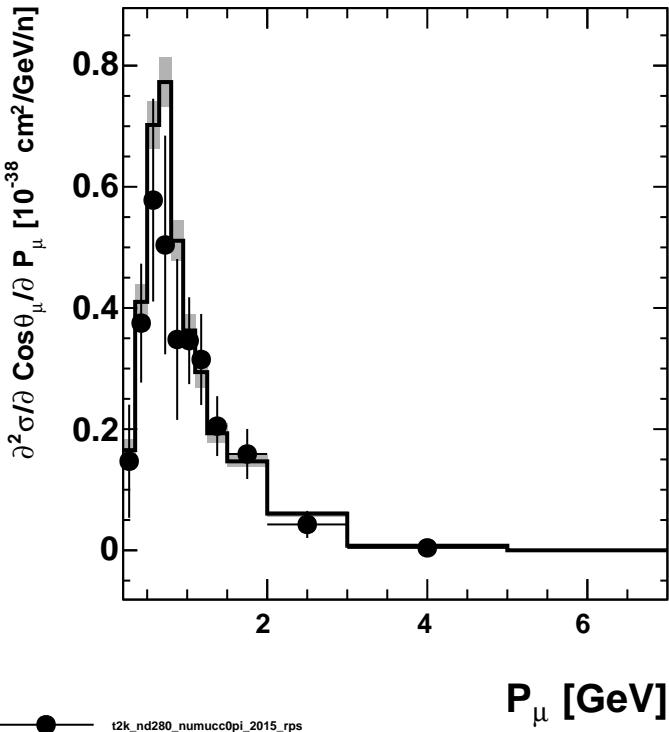
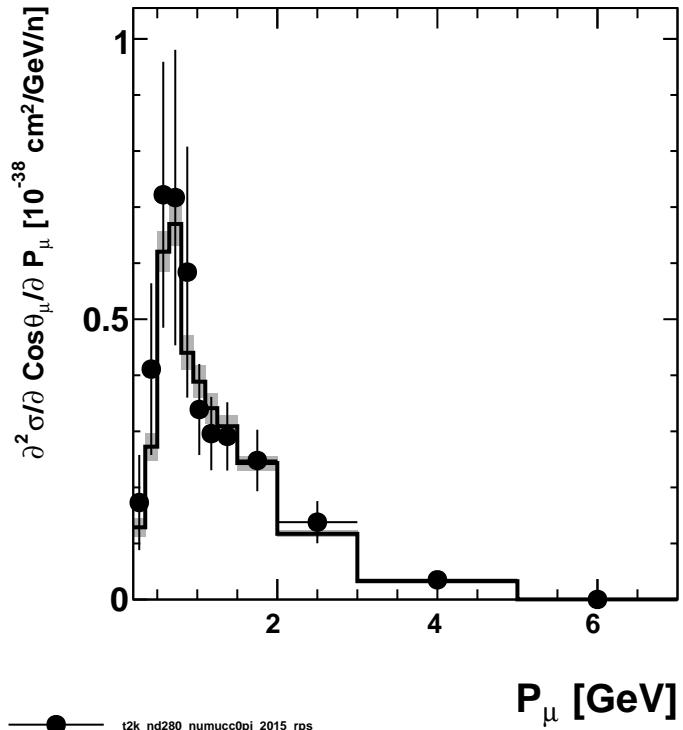
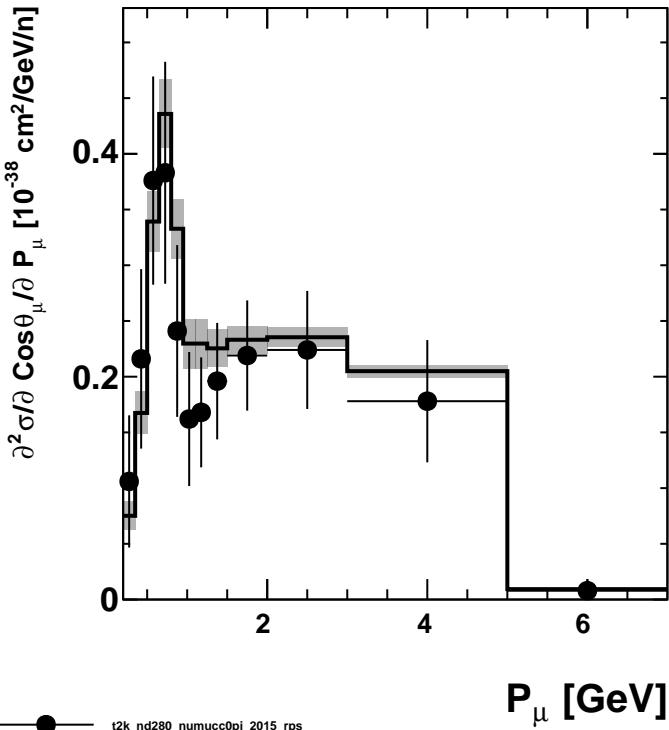
$P_\mu \in [0.2; 0.35] \text{ GeV}$  $P_\mu \in [0.35; 0.5] \text{ GeV}$  $P_\mu \in [0.5; 0.65] \text{ GeV}$  $P_\mu \in [0.65; 0.8] \text{ GeV}$ 

$P_\mu \in [0.8; 0.95] \text{ GeV}$  $P_\mu \in [0.95; 1.1] \text{ GeV}$  $P_\mu \in [1.1; 1.25] \text{ GeV}$  $P_\mu \in [1.25; 1.5] \text{ GeV}$ 

$P_\mu \in [1.5; 2] \text{ GeV}$  $P_\mu \in [2; 3] \text{ GeV}$ 

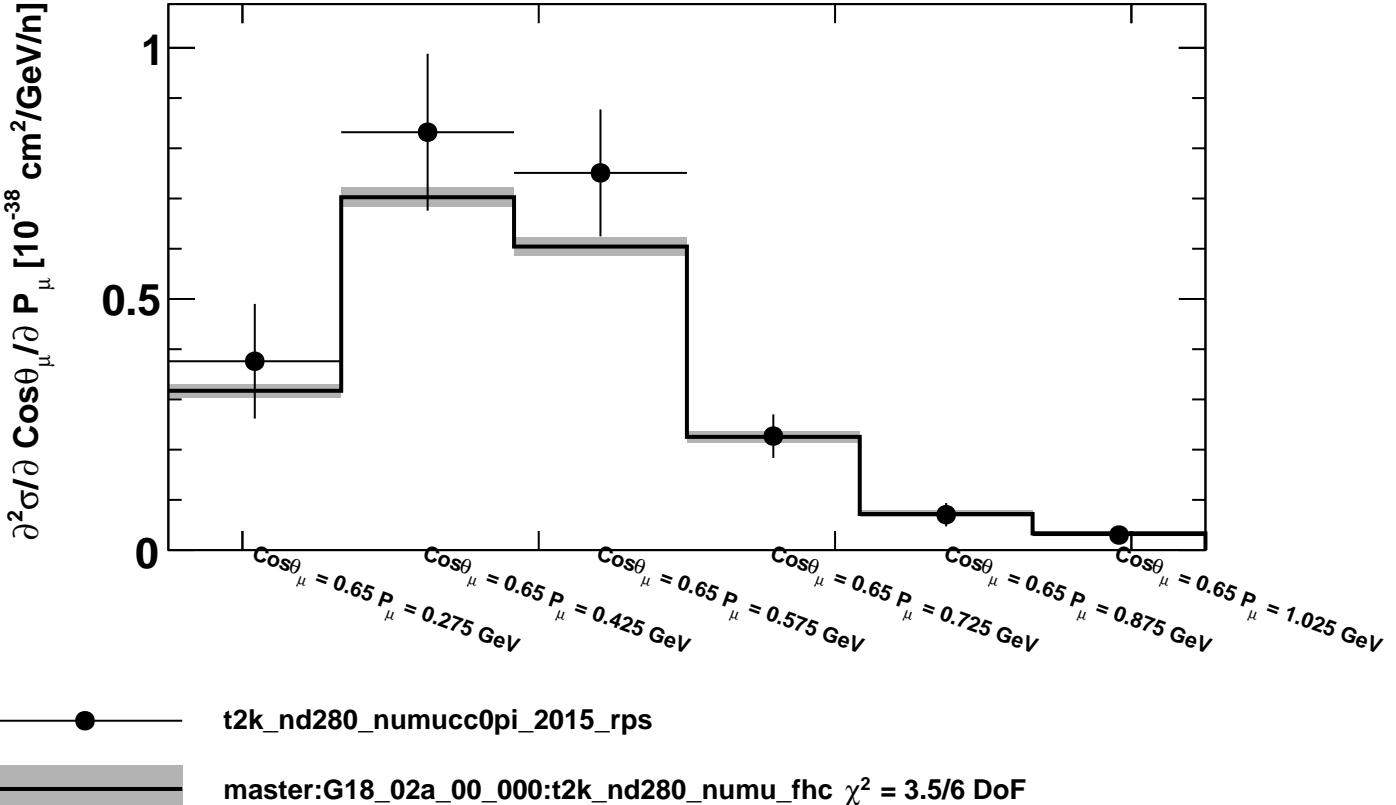


$\text{Cos}\theta_\mu \in [0.6; 0.7]$ master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 6.53/8$  DoF $\text{Cos}\theta_\mu \in [0.7; 0.8]$ master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 14.8/9$  DoF $\text{Cos}\theta_\mu \in [0.8; 0.85]$ master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 7.84/8$  DoF $\text{Cos}\theta_\mu \in [0.85; 0.9]$ master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 15.3/9$  DoF

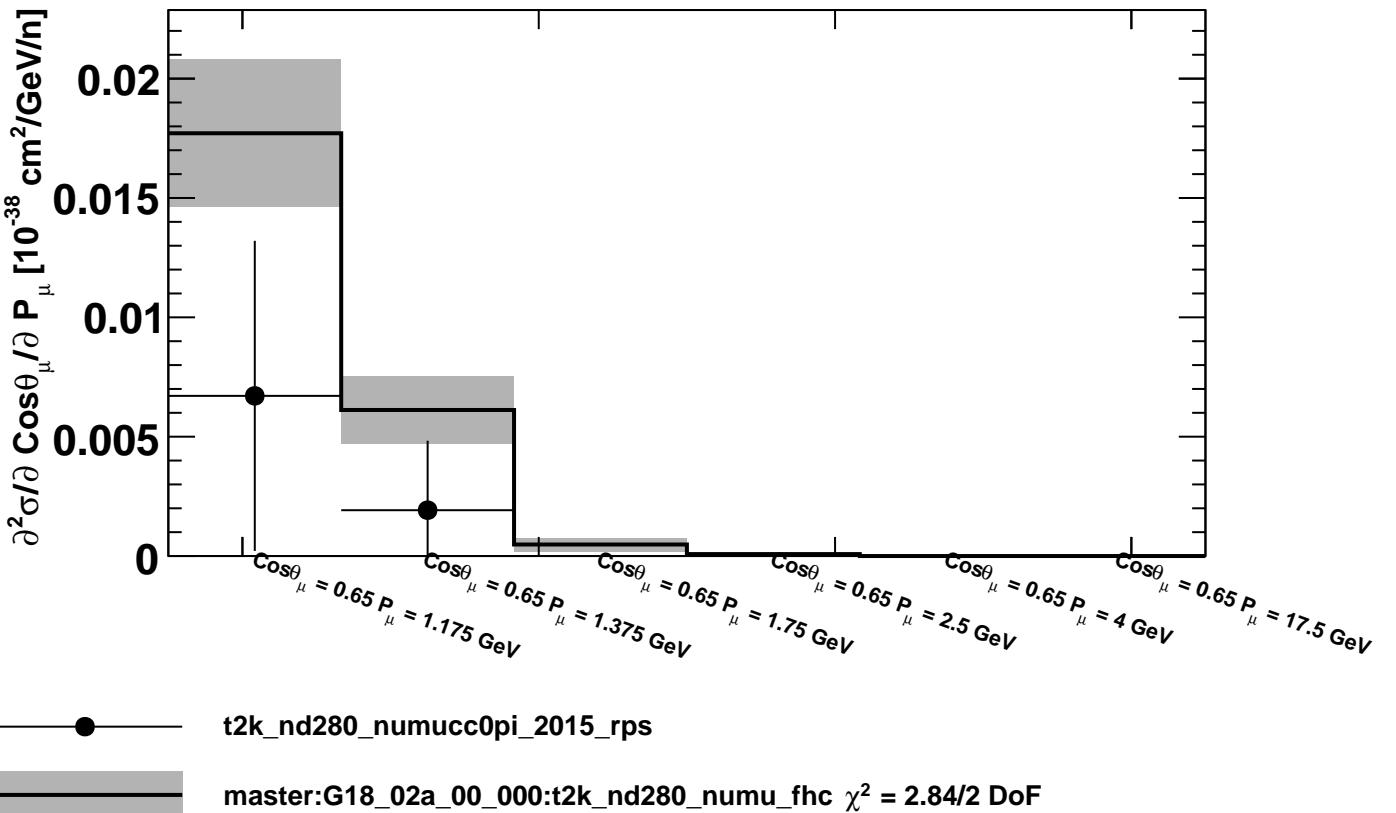
$\text{Cos}\theta_\mu \in [0.9; 0.925]$  $\text{Cos}\theta_\mu \in [0.925; 0.95]$  $\text{Cos}\theta_\mu \in [0.95; 0.975]$  $\text{Cos}\theta_\mu \in [0.975; 1]$ 



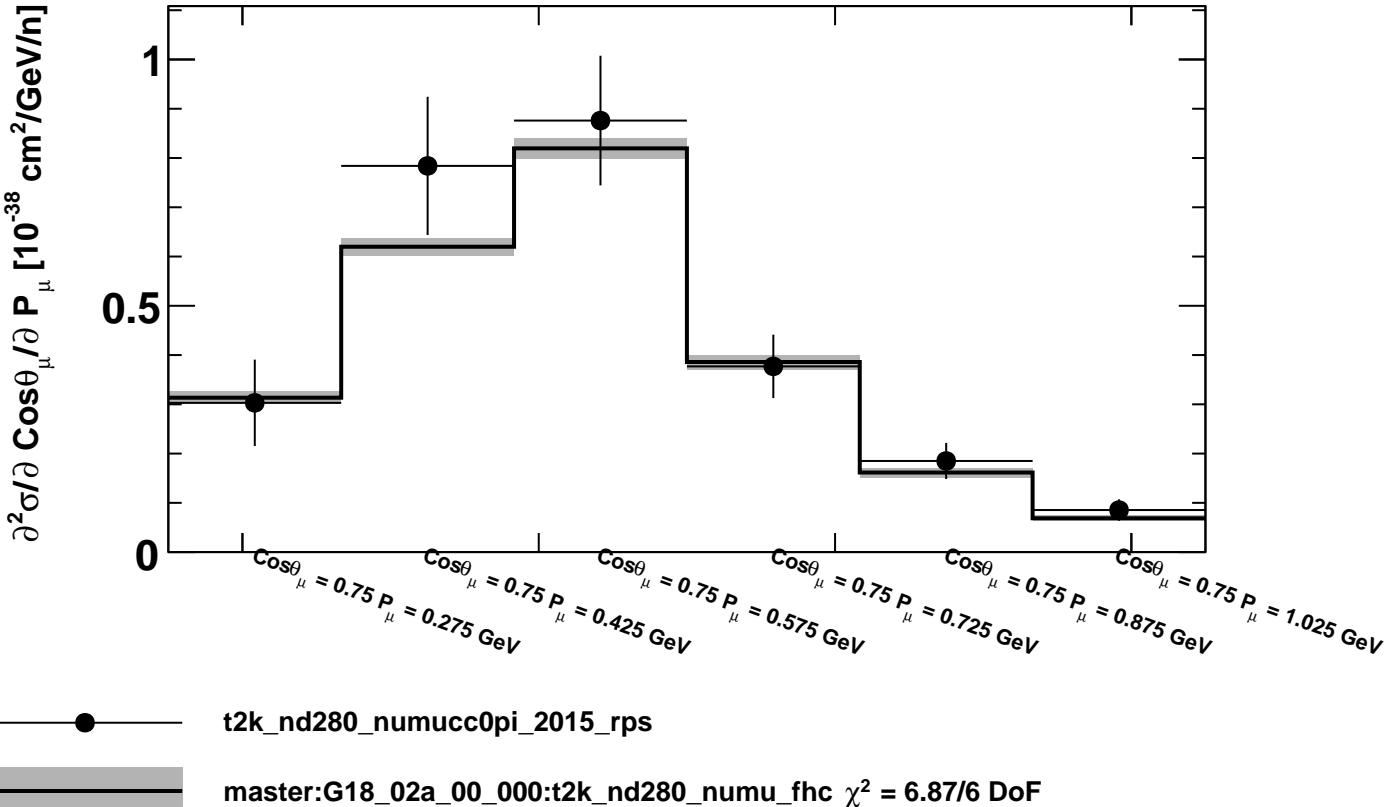
Bin  $\in [0; 5]$



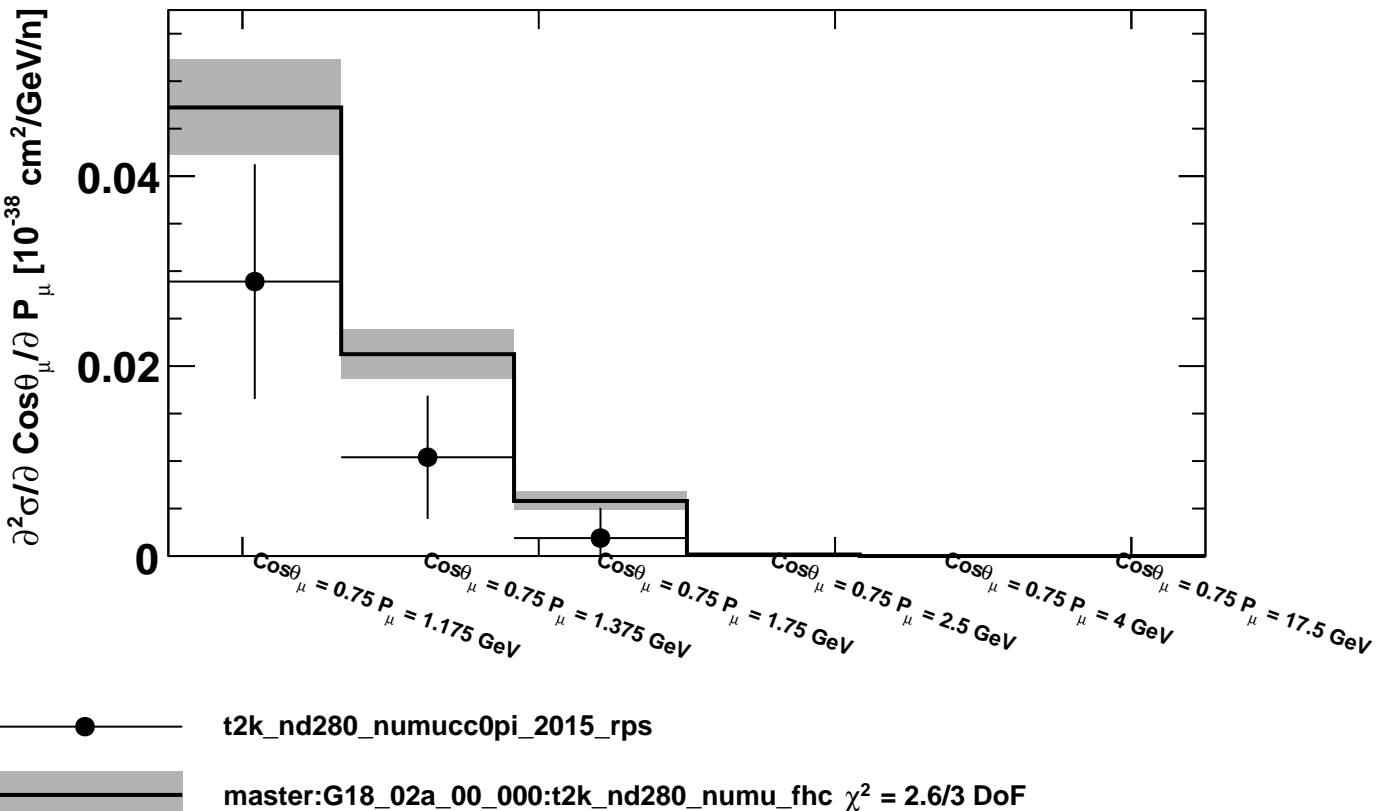
Bin  $\in [6; 11]$



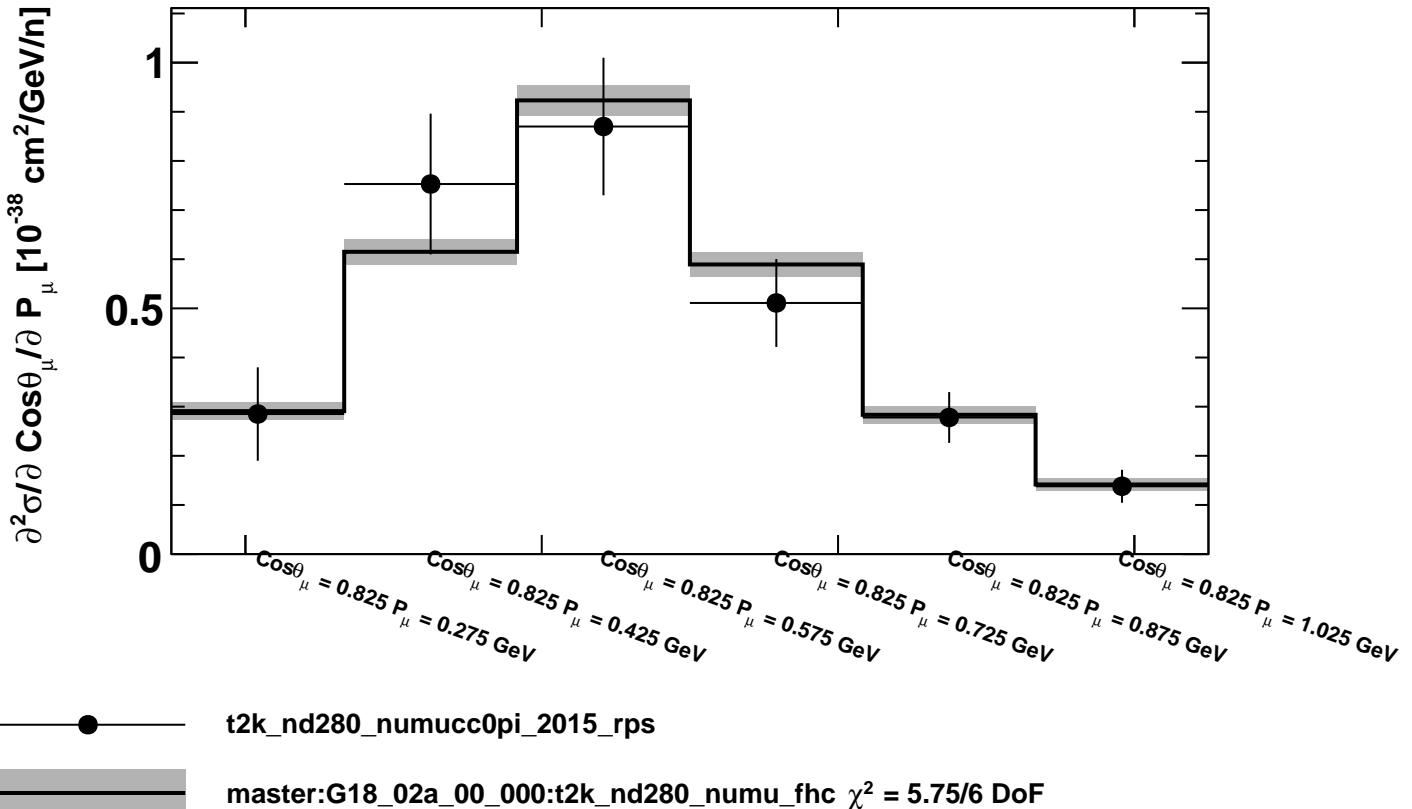
Bin  $\in [12; 17]$



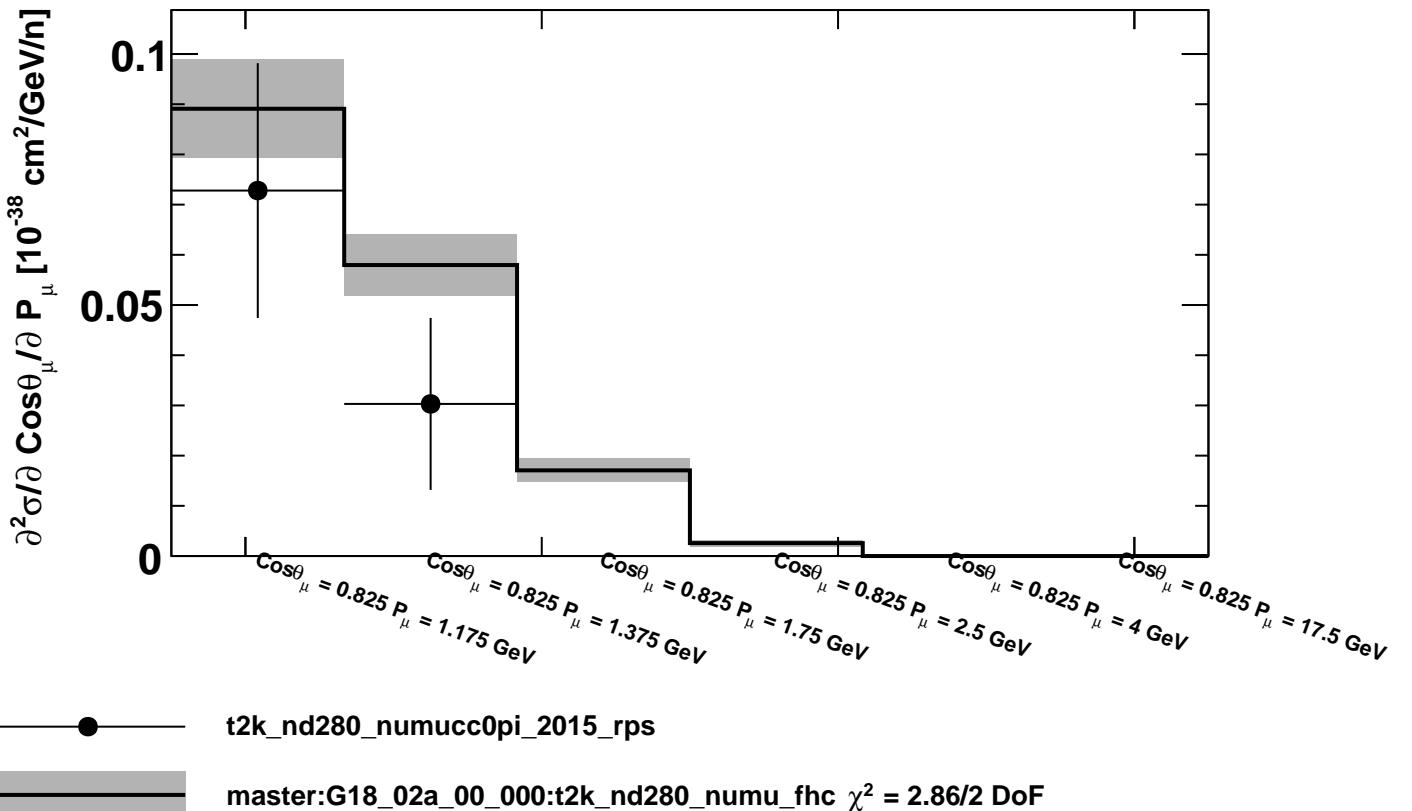
Bin  $\in [18; 23]$



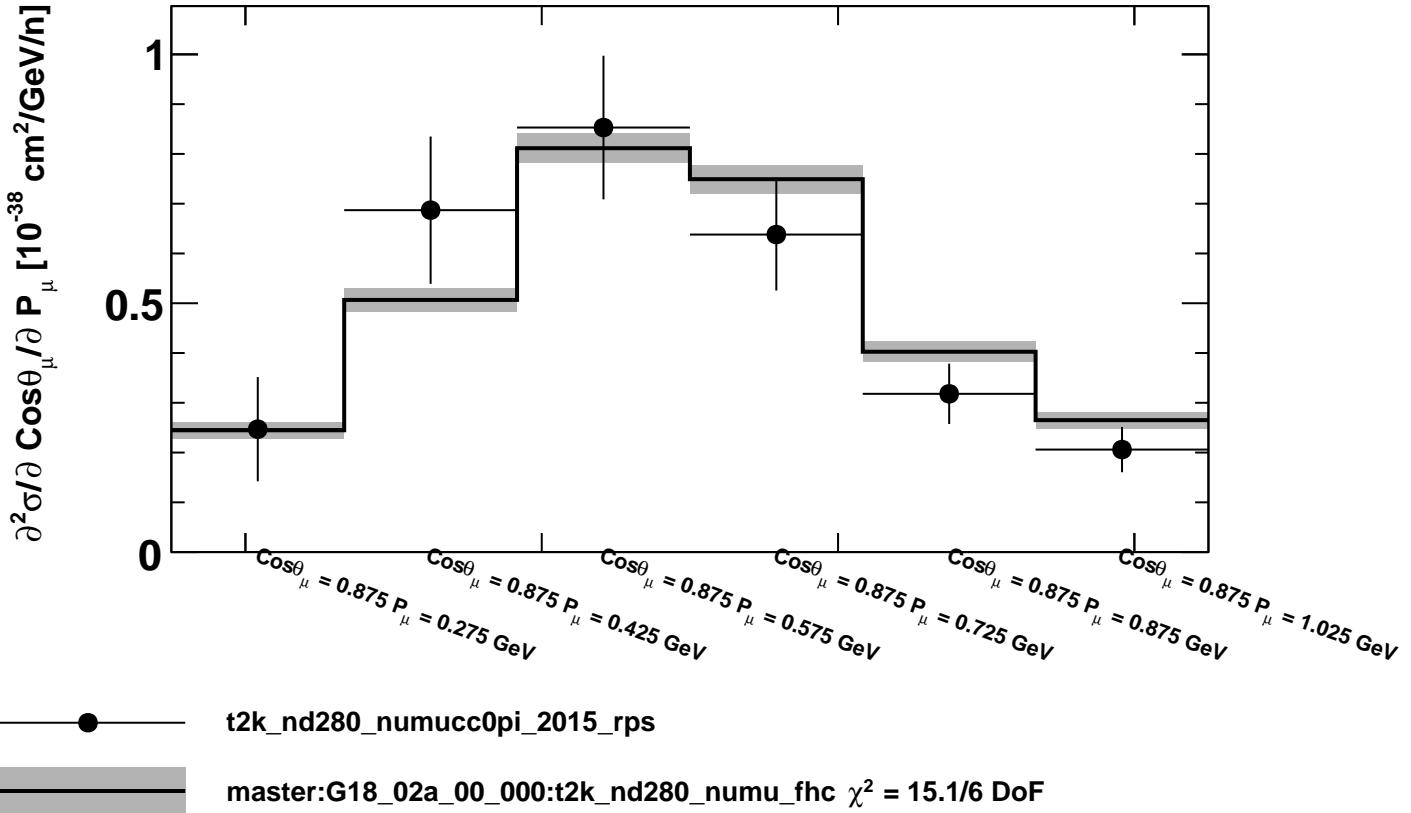
Bin  $\in [ 24; 29 ]$



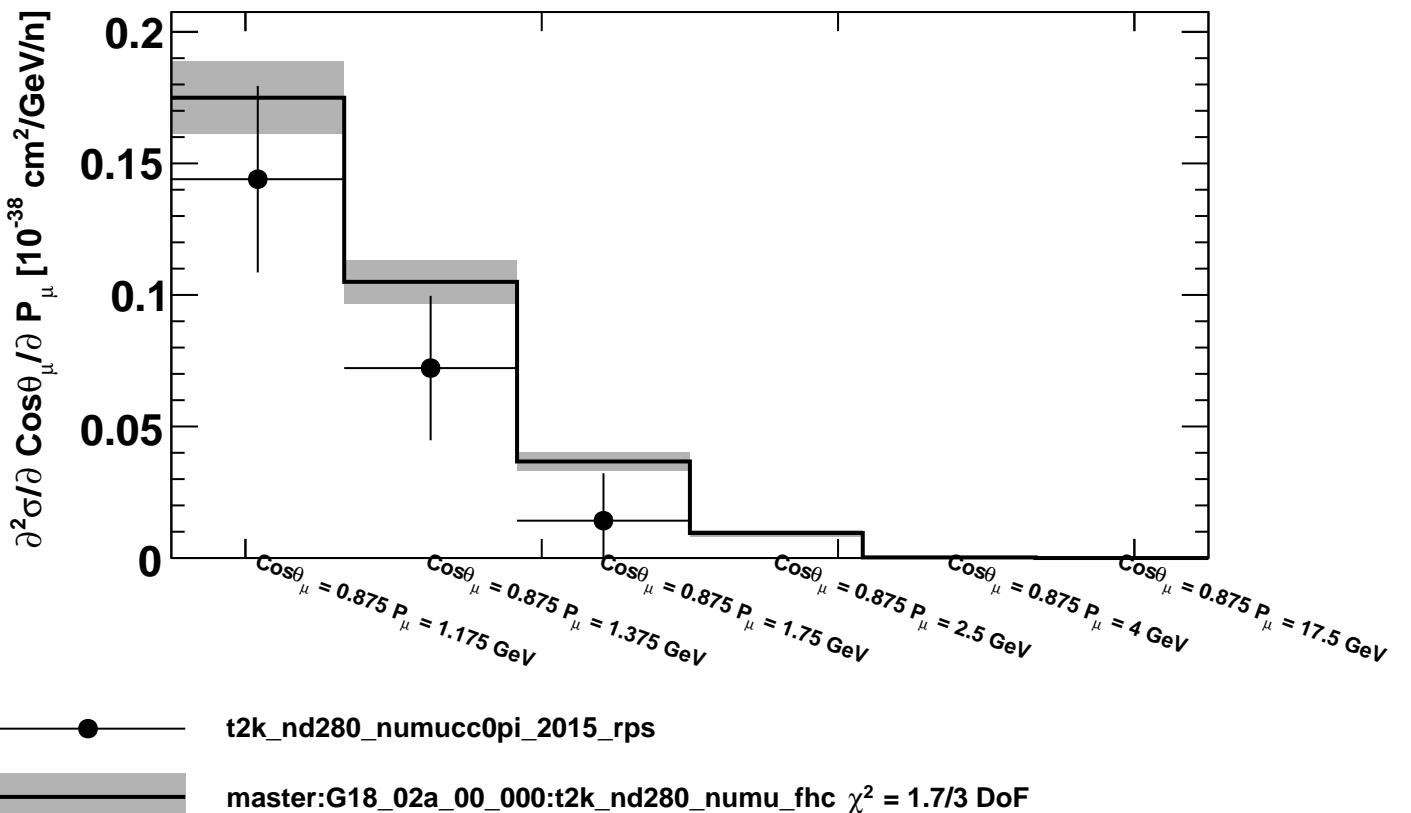
Bin  $\in [ 30; 35 ]$



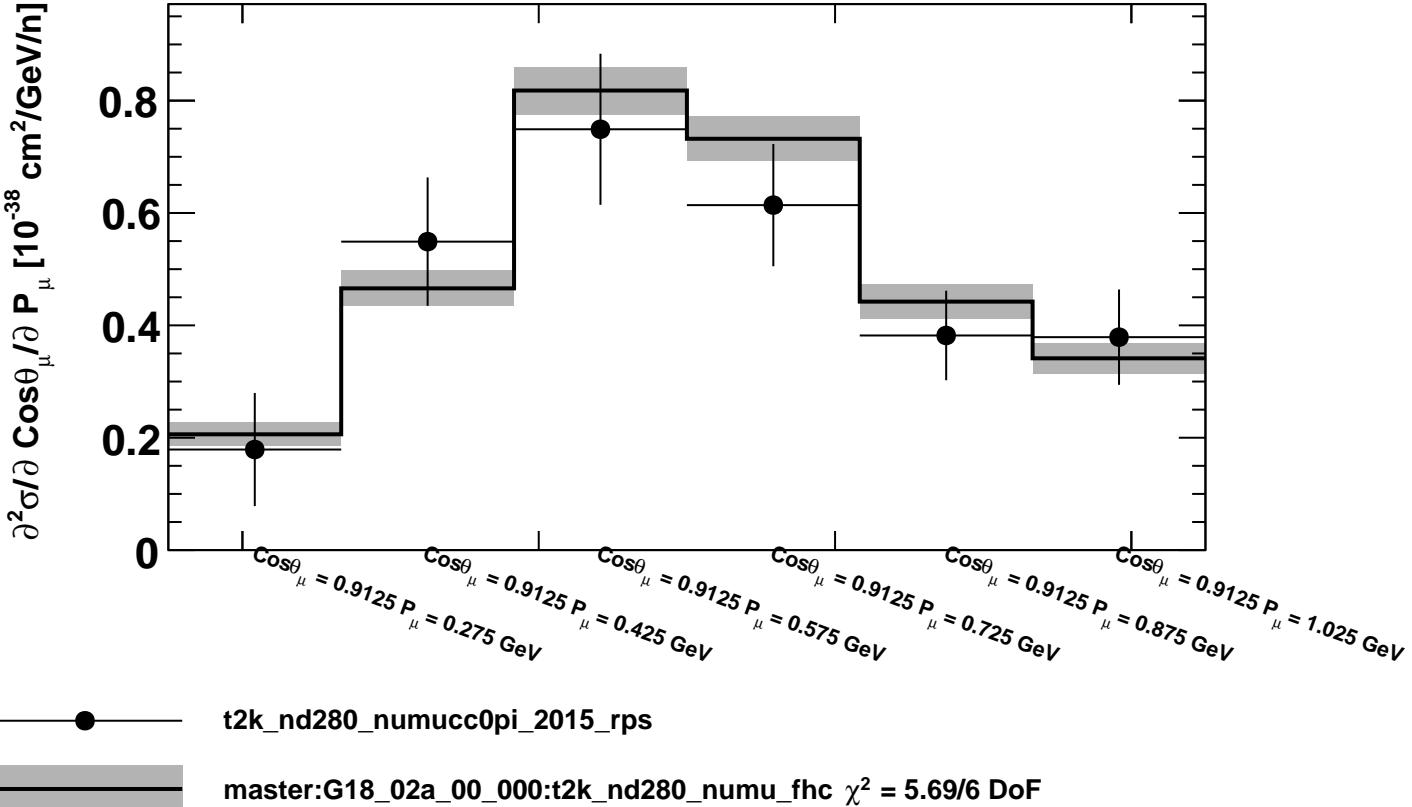
Bin  $\in [36; 41]$



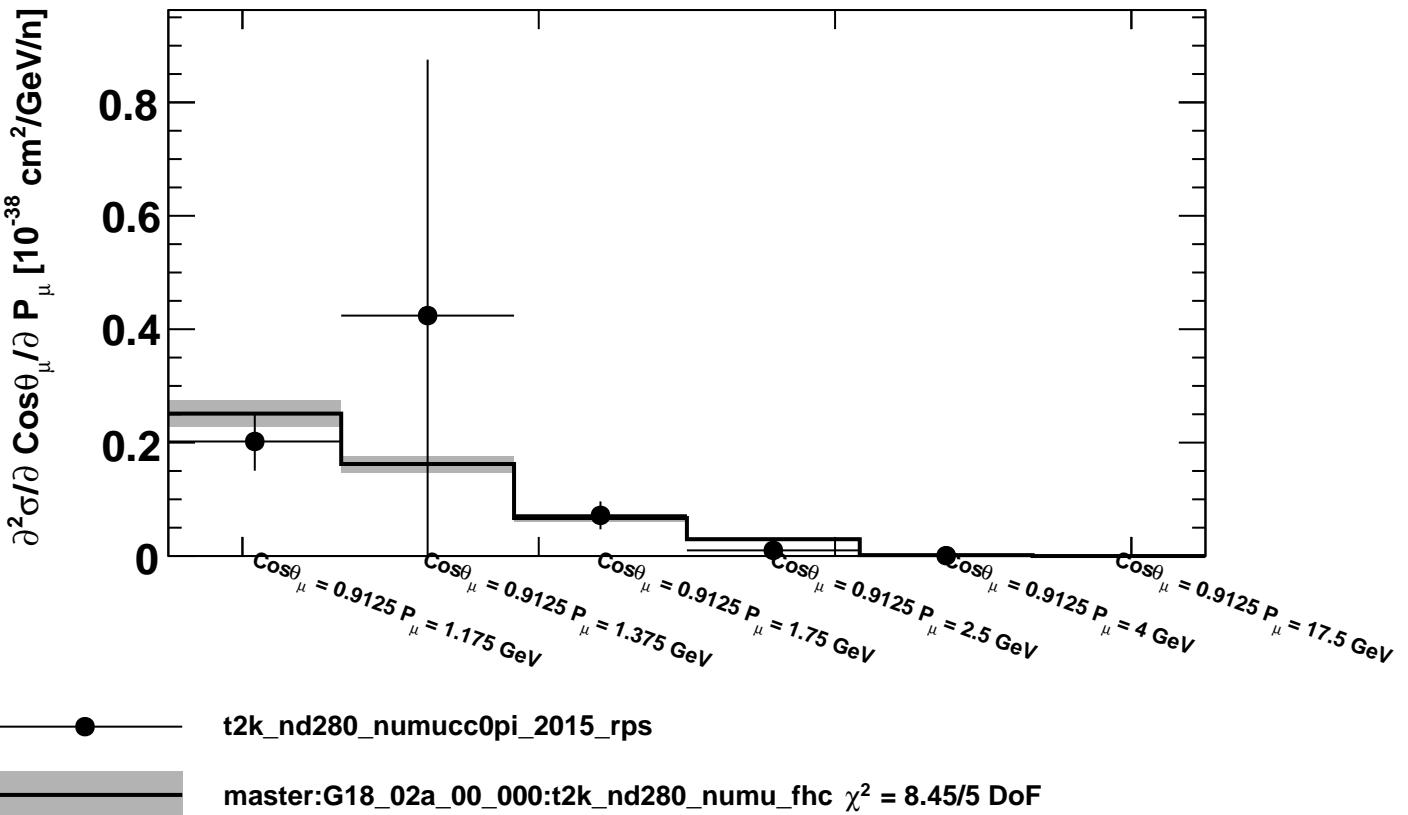
Bin  $\in [42; 47]$



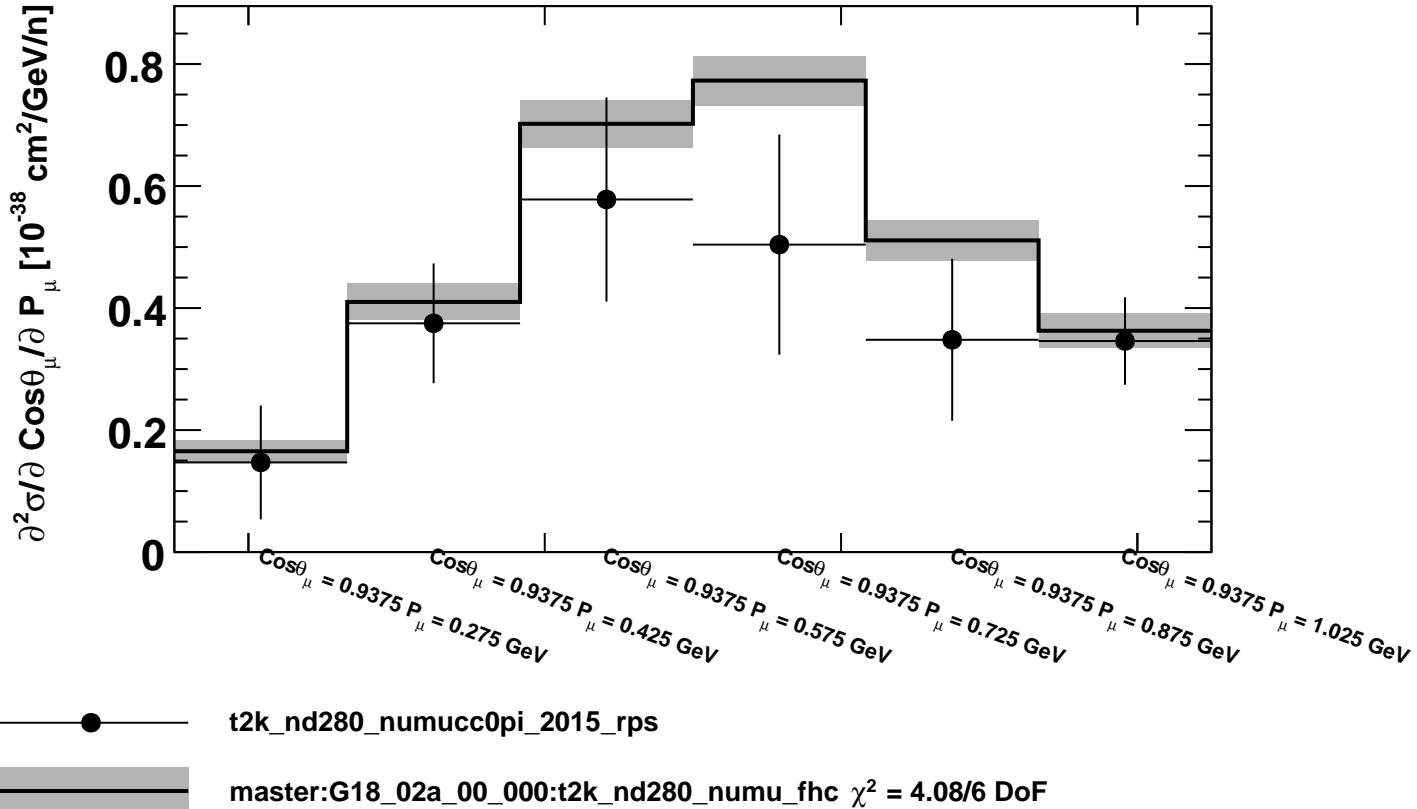
Bin  $\in [48; 53]$



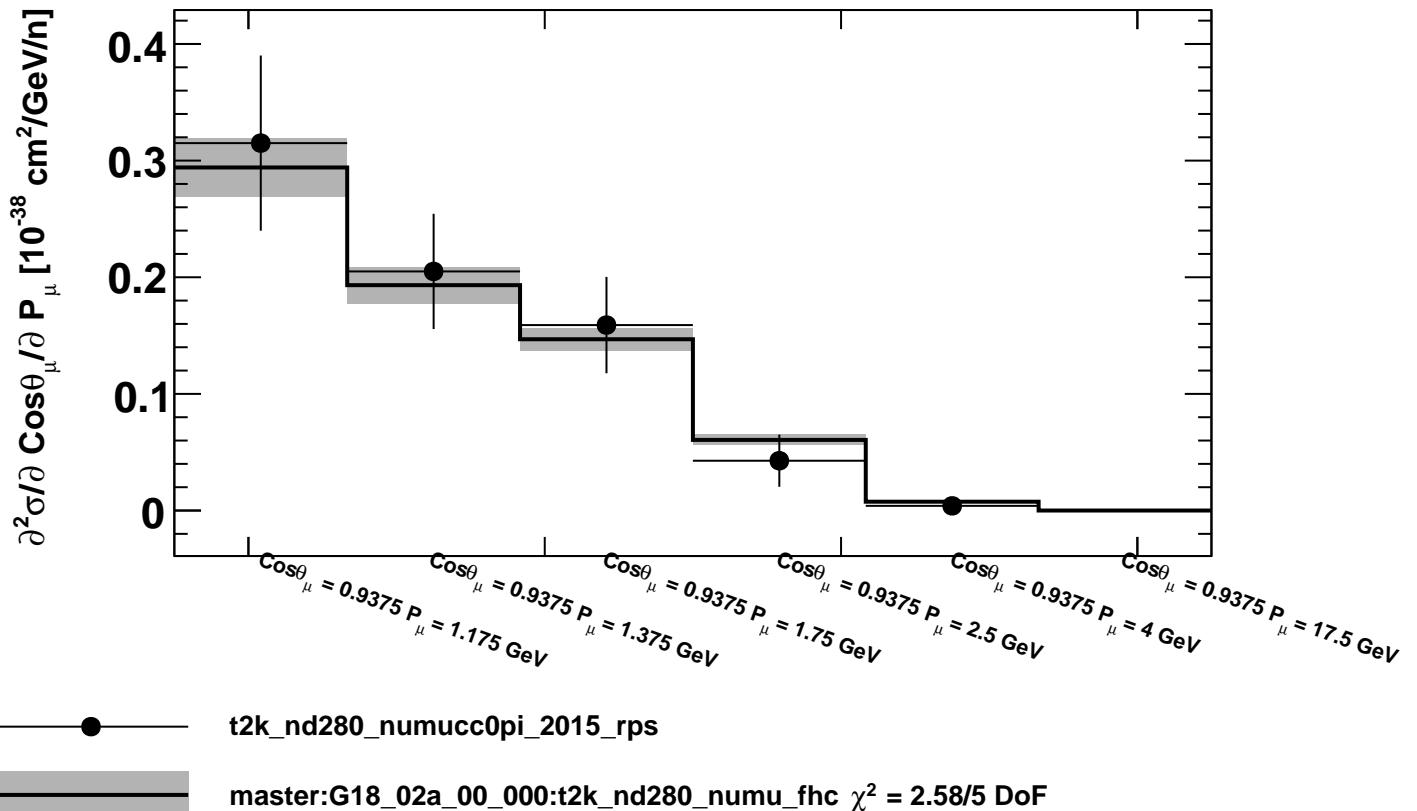
Bin  $\in [54; 59]$



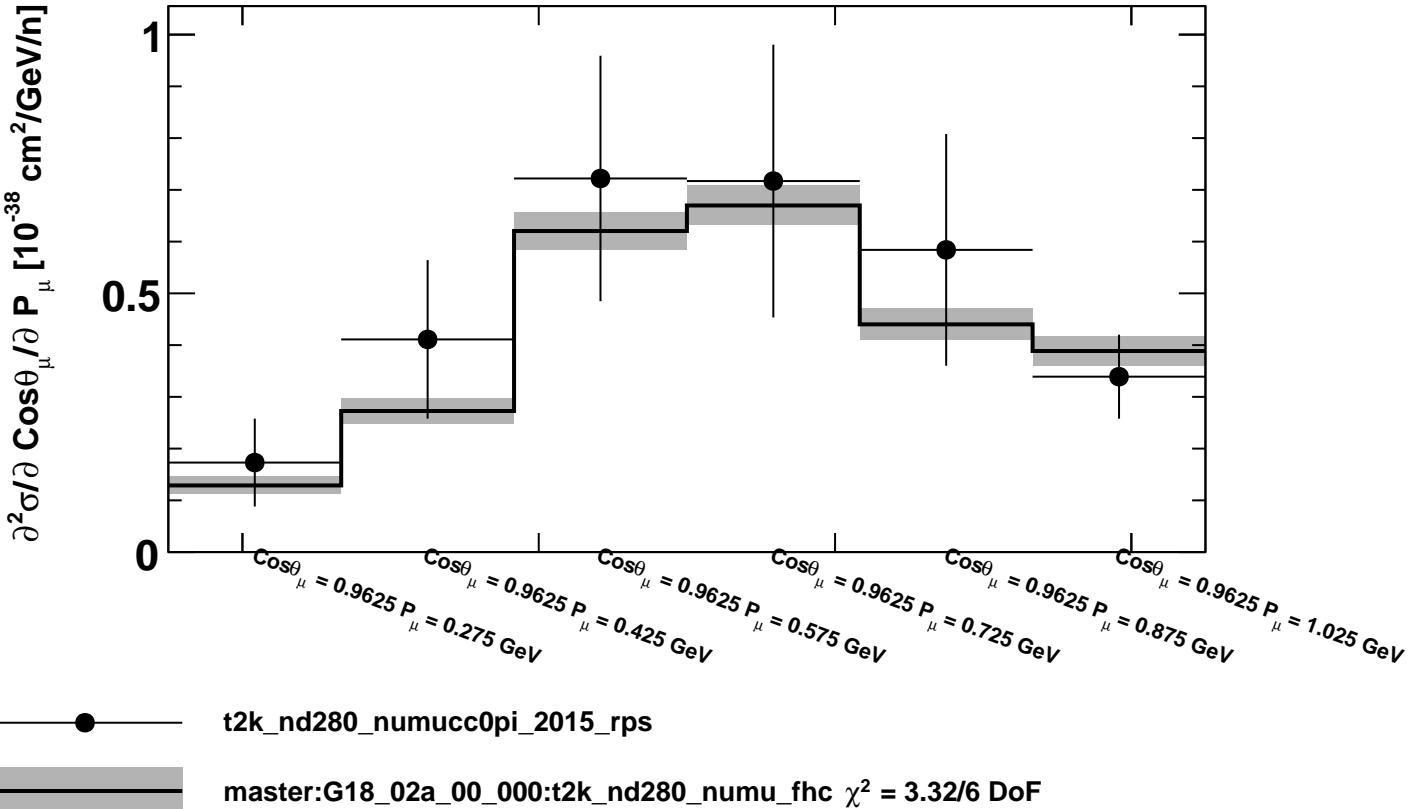
Bin  $\in [60; 65]$



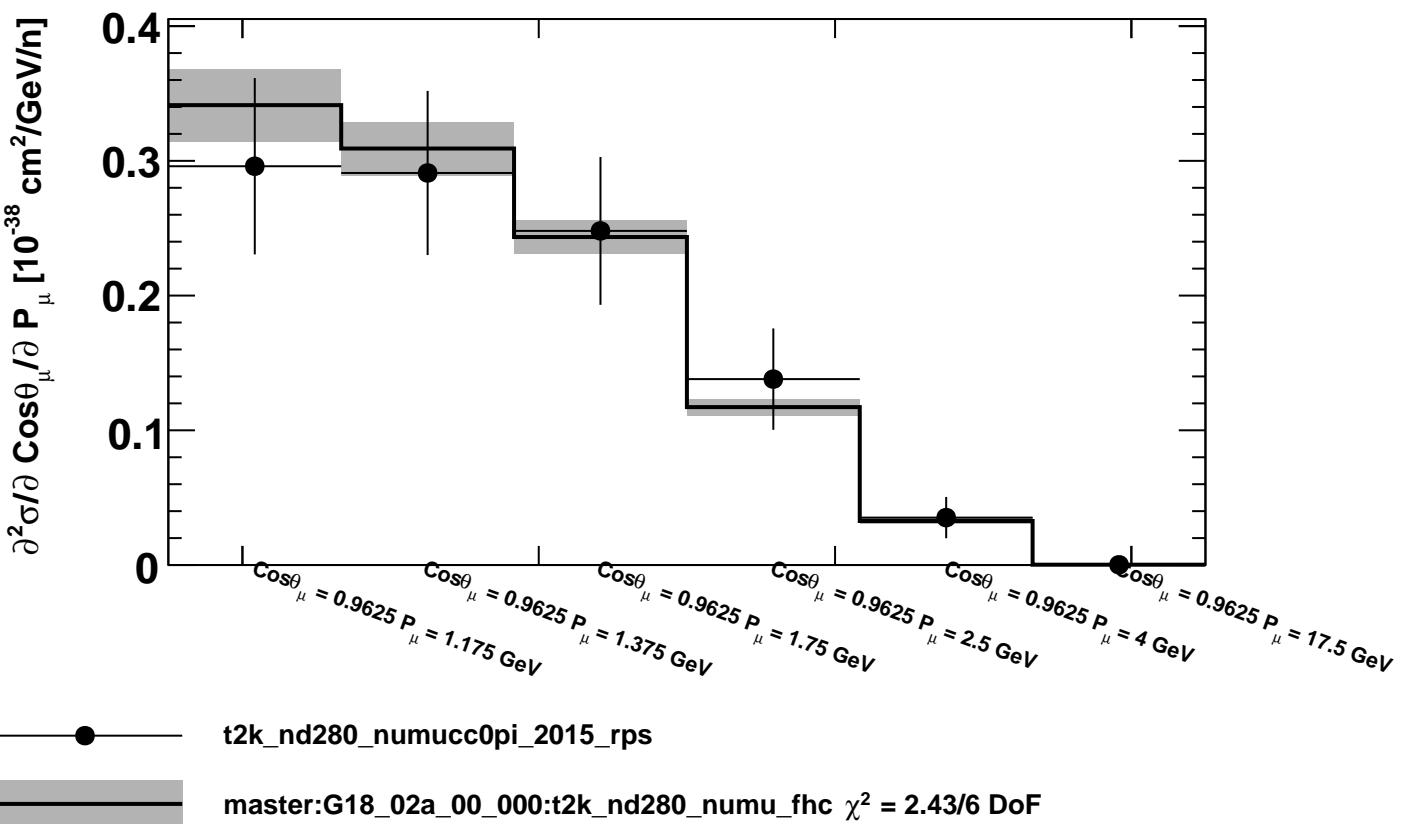
Bin  $\in [66; 71]$



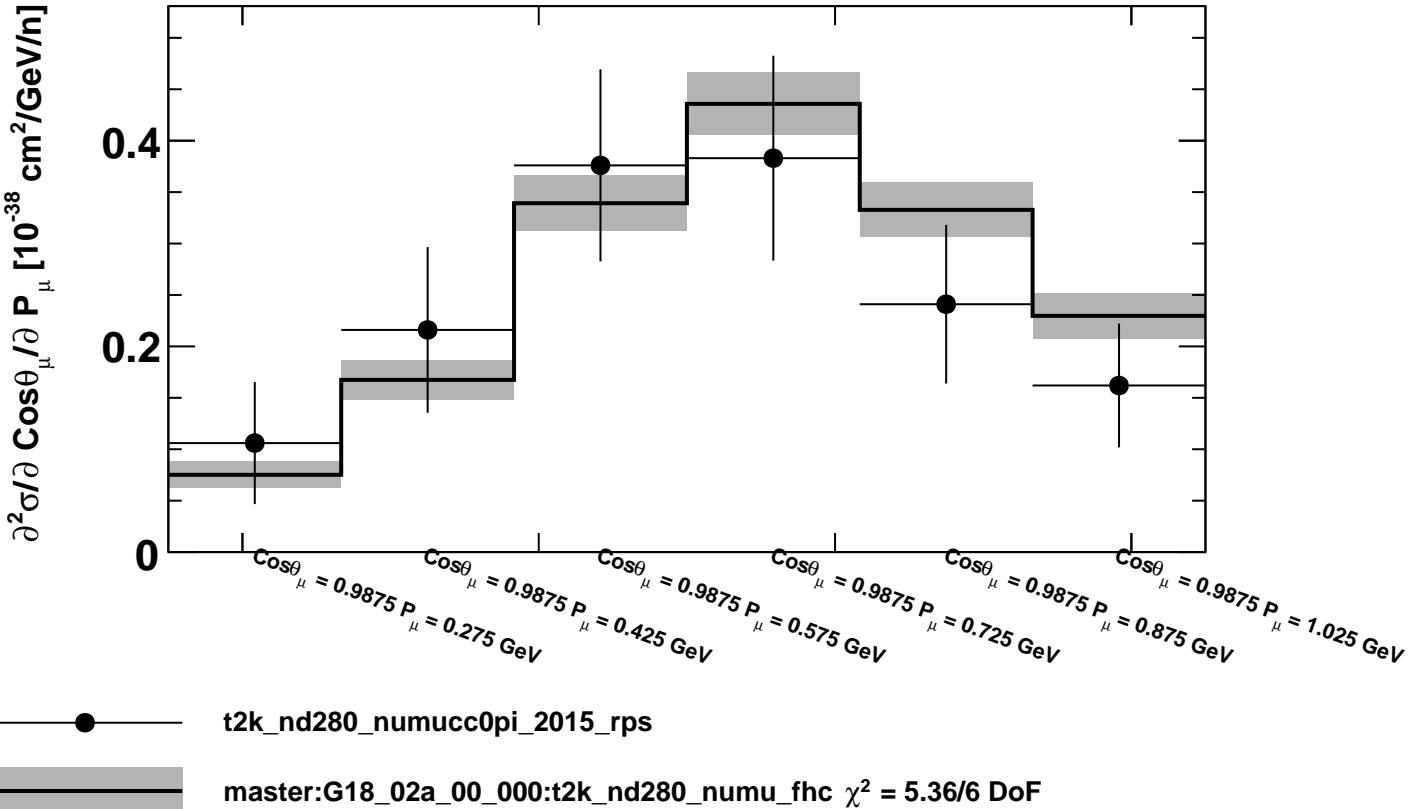
Bin  $\in [72; 77]$



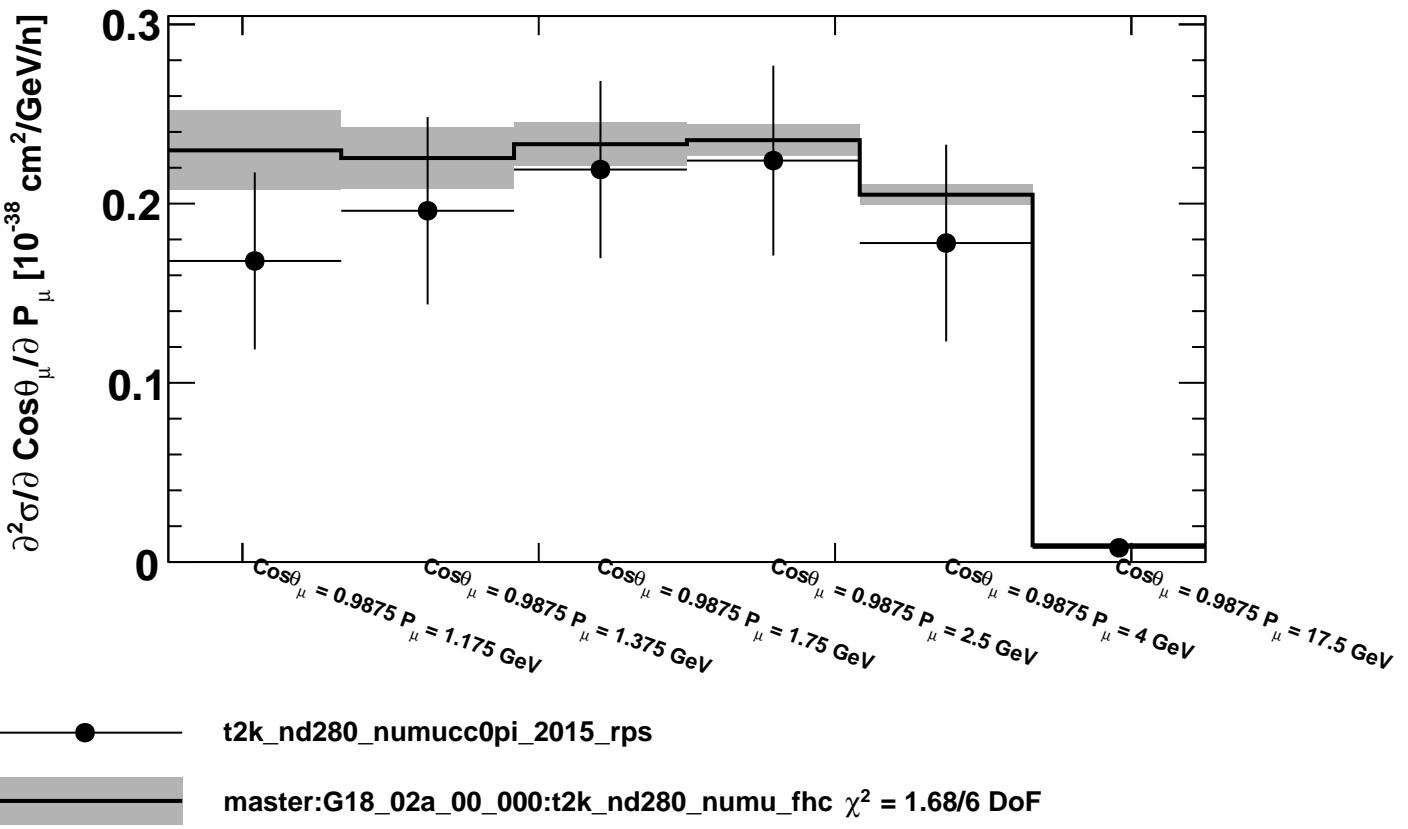
Bin  $\in [78; 83]$



Bin  $\in [84; 89]$



Bin  $\in [90; 95]$



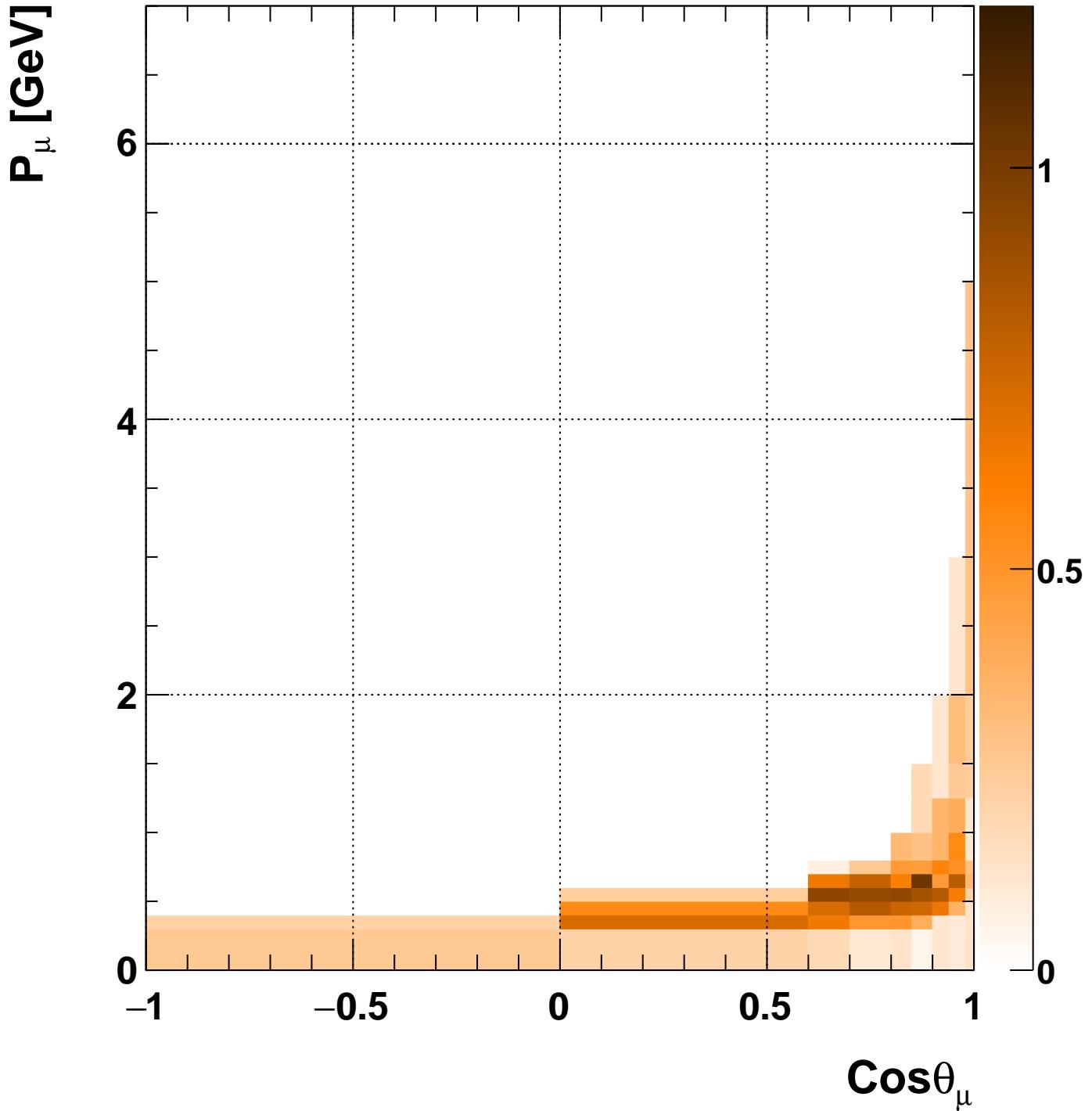
**Dataset:**  
**t2k\_nd280\_numucc0pi\_2015**

**Model:**  
**master/G18\_02a\_00\_000  $\chi^2 = 150 / 67$  DoF**

**Plot:**  
 $\partial^2\sigma/\partial \text{Cos}\theta_\mu/\partial P_\mu$   
**67 DoF,  $\chi^2 = 150$**

**2018/10/15 09:40:43**

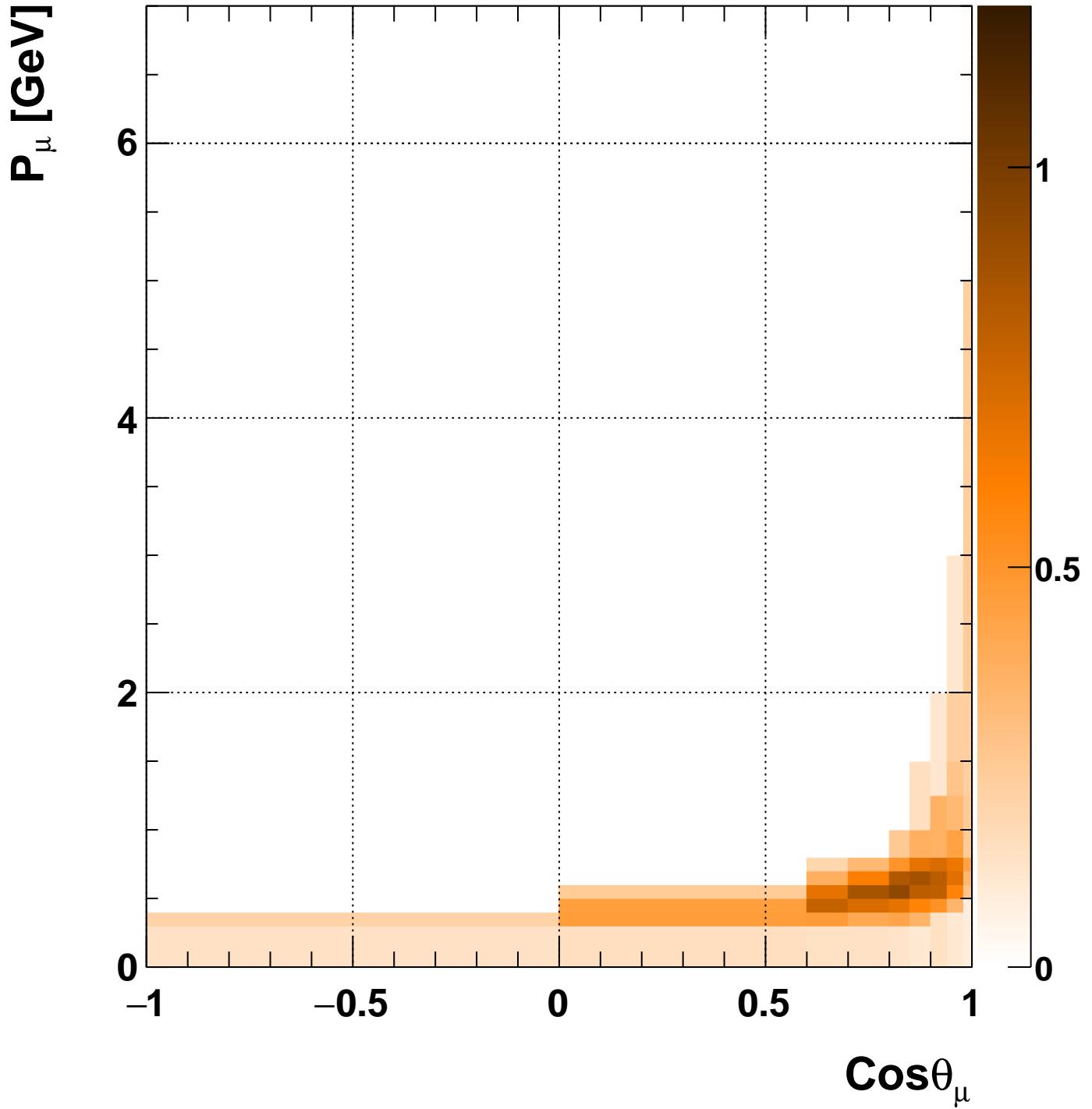
© 2003-2018, GENIE - <http://www.genie-mc.org>



$\partial^2\sigma/\partial \text{Cos}\theta_\mu/\partial P_\mu [10^{-38} \text{ cm}^2/\text{GeV}/n]$

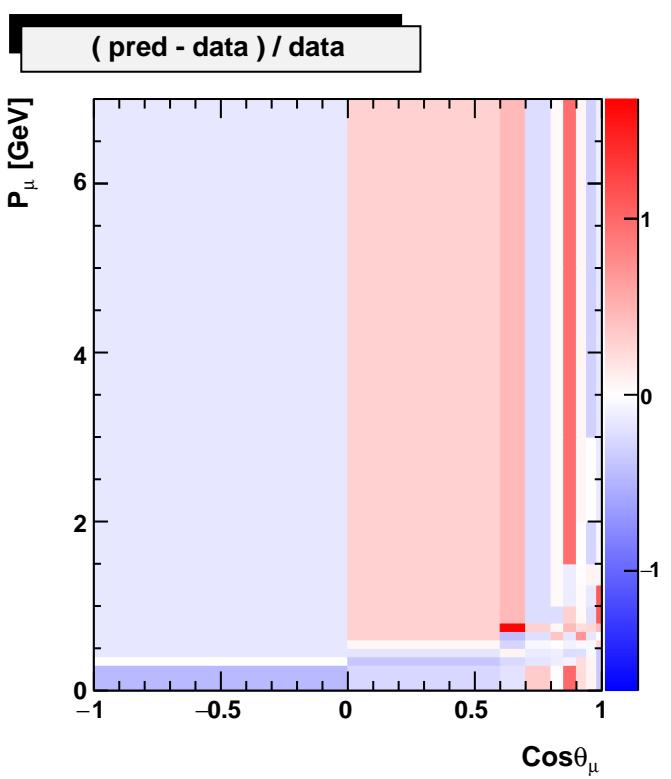
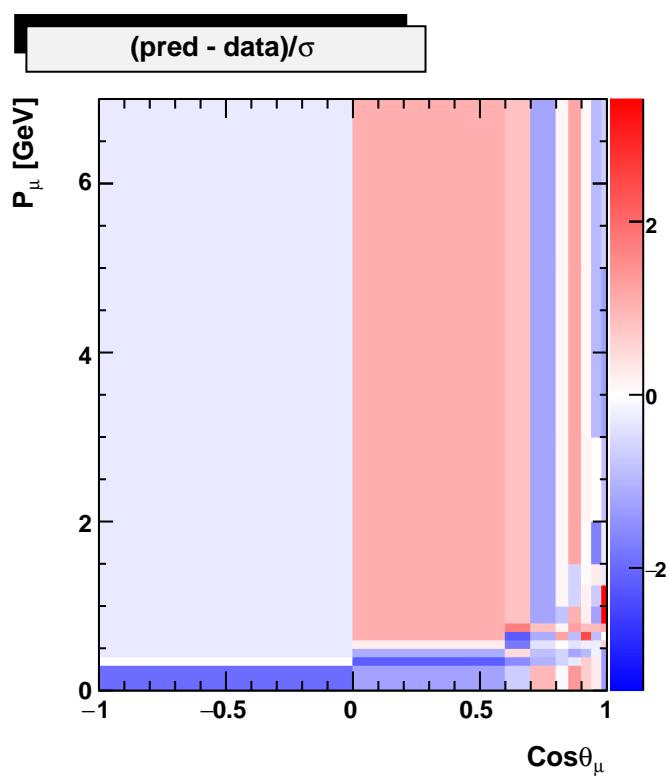
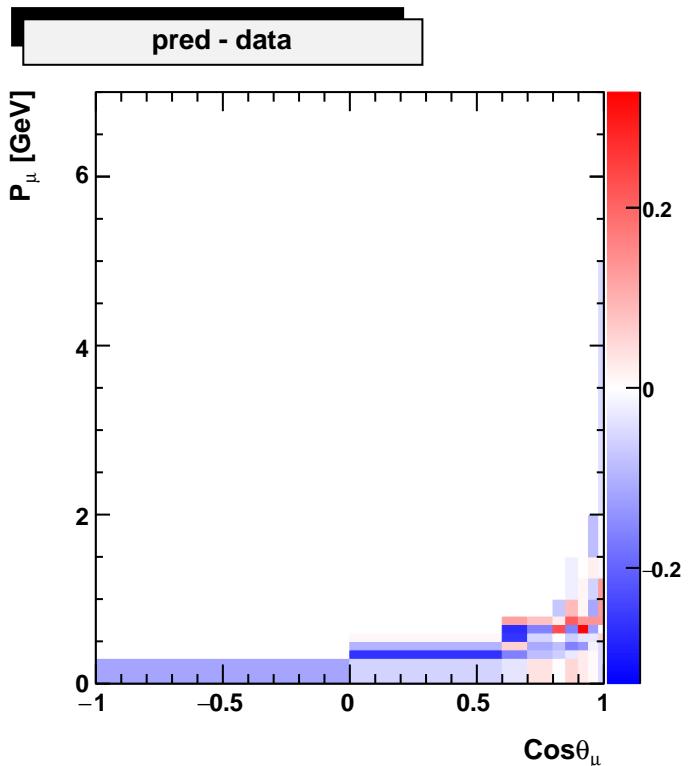
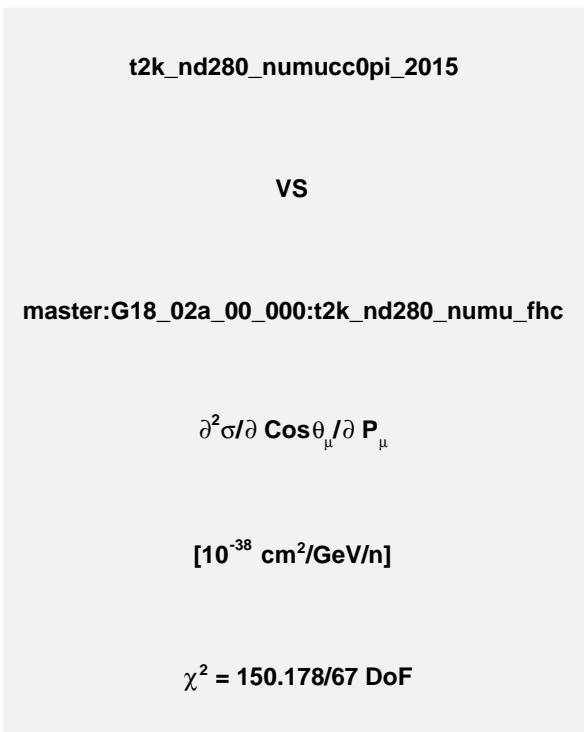
Data: t2k\_nd280\_numucc0pi\_2015

© 2003-2018, GENIE - <http://www.genie-mc.org>



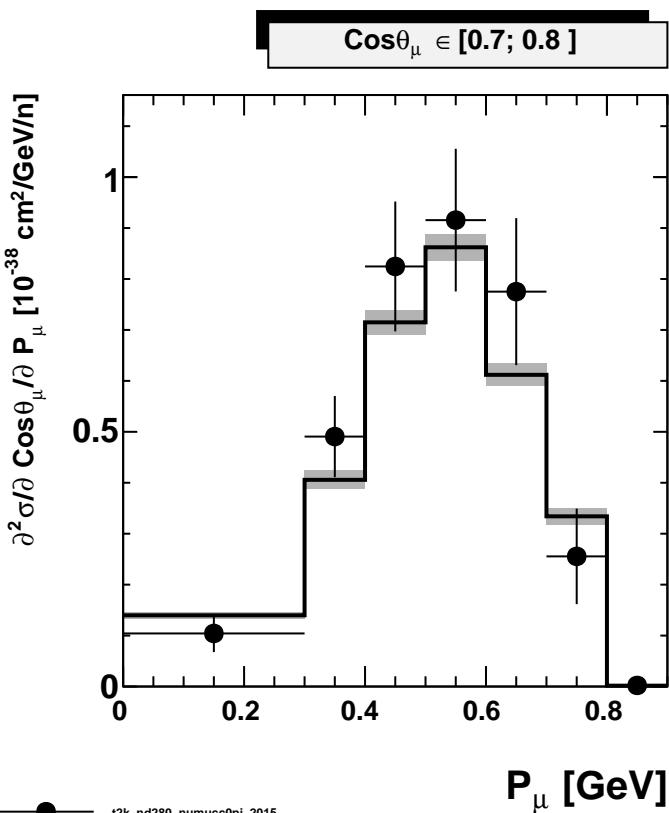
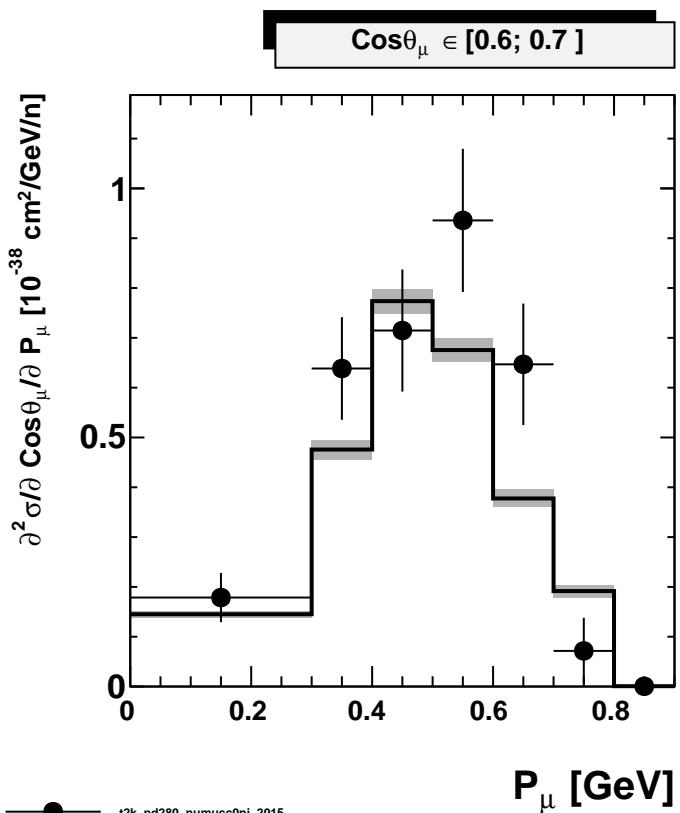
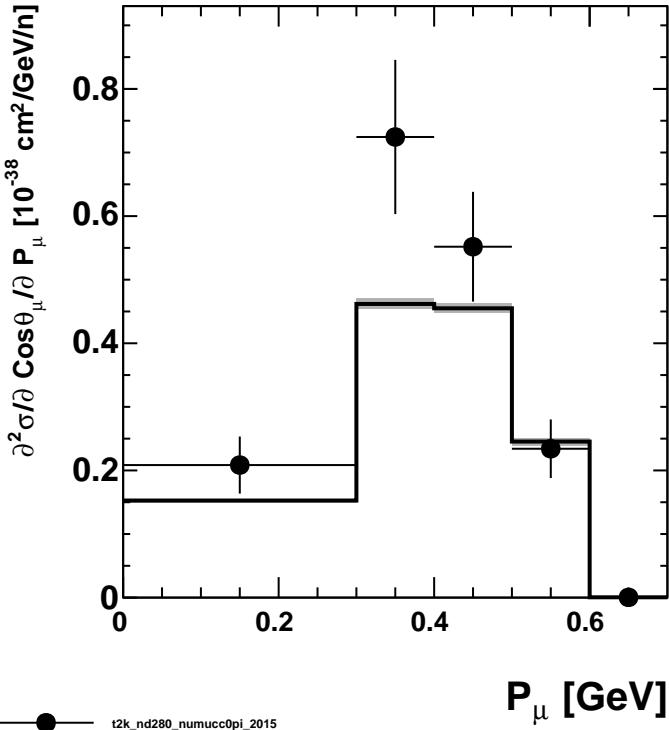
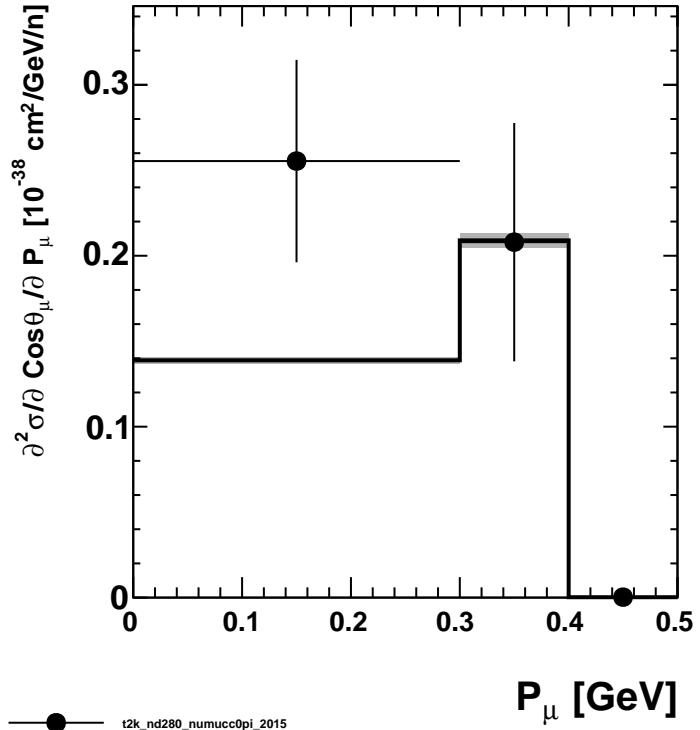
$$\frac{\partial^2 \sigma}{\partial \text{Cos}\theta_\mu / \partial P_\mu} [10^{-38} \text{cm}^2/\text{GeV}/n]$$

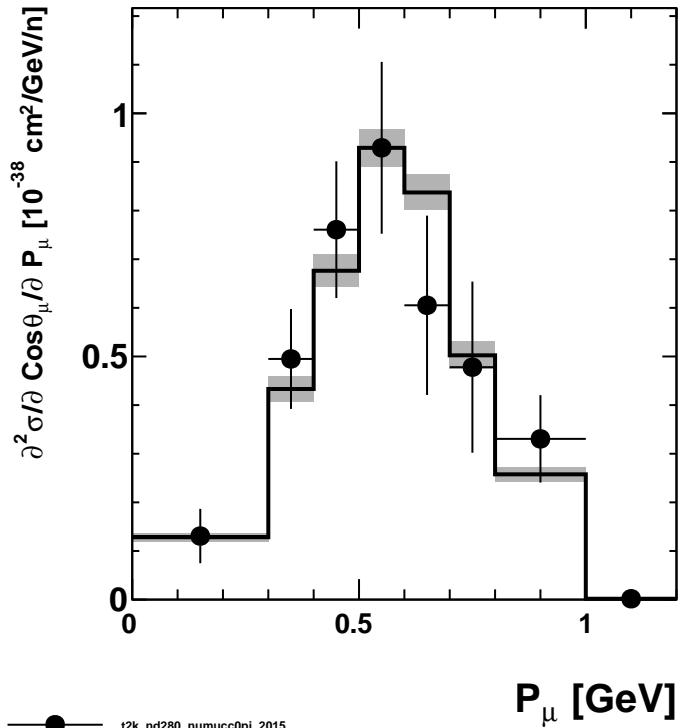
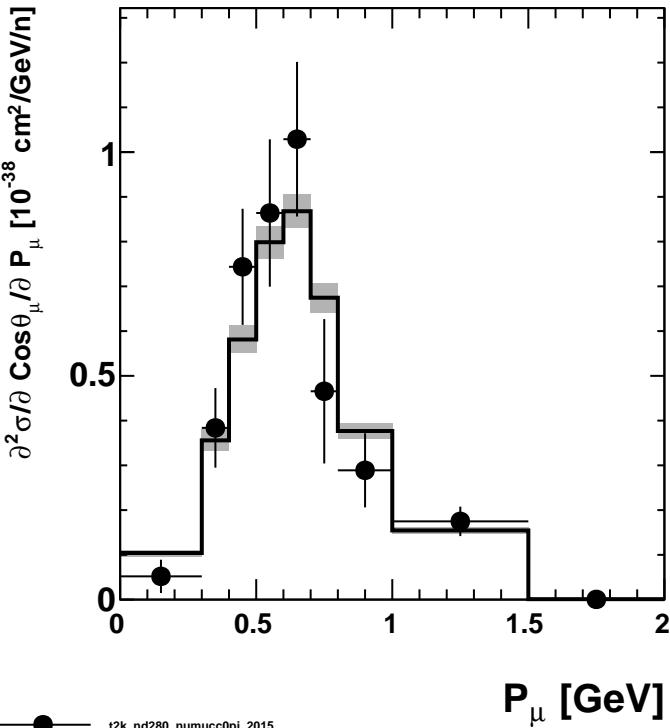
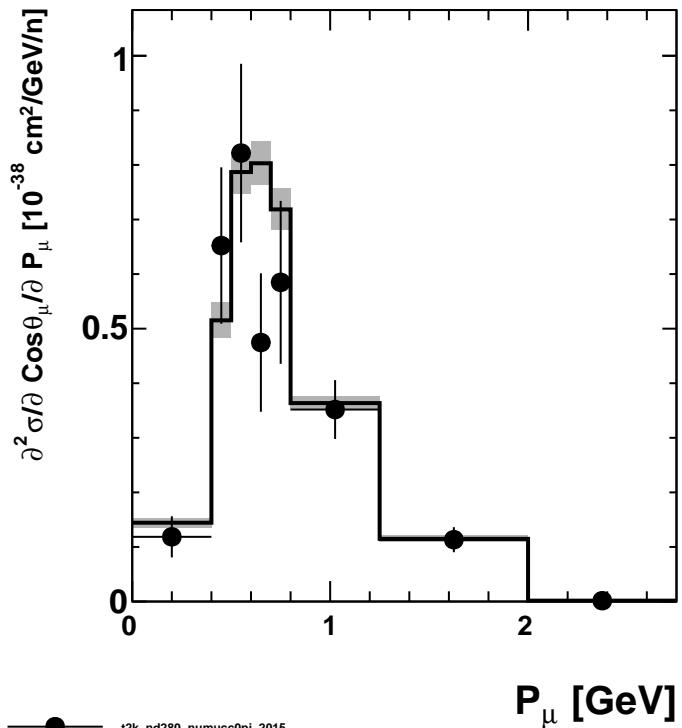
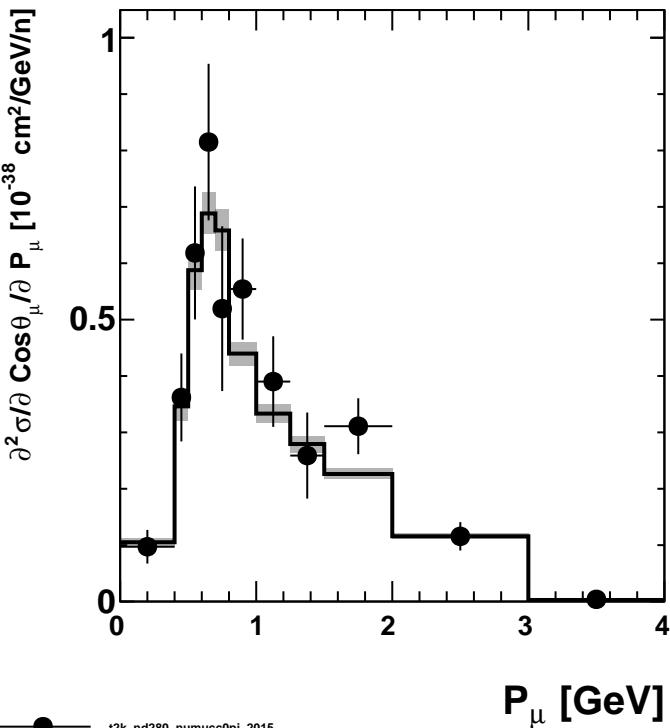
Pred: master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc







$\text{Cos}\theta_\mu \in [-1; 0]$  $\text{Cos}\theta_\mu \in [0; 0.6]$ 

$\text{Cos}\theta_\mu \in [0.8; 0.85]$  $\text{Cos}\theta_\mu \in [0.85; 0.9 ]$  $\text{Cos}\theta_\mu \in [0.9; 0.94 ]$  $\text{Cos}\theta_\mu \in [0.94; 0.98 ]$ 

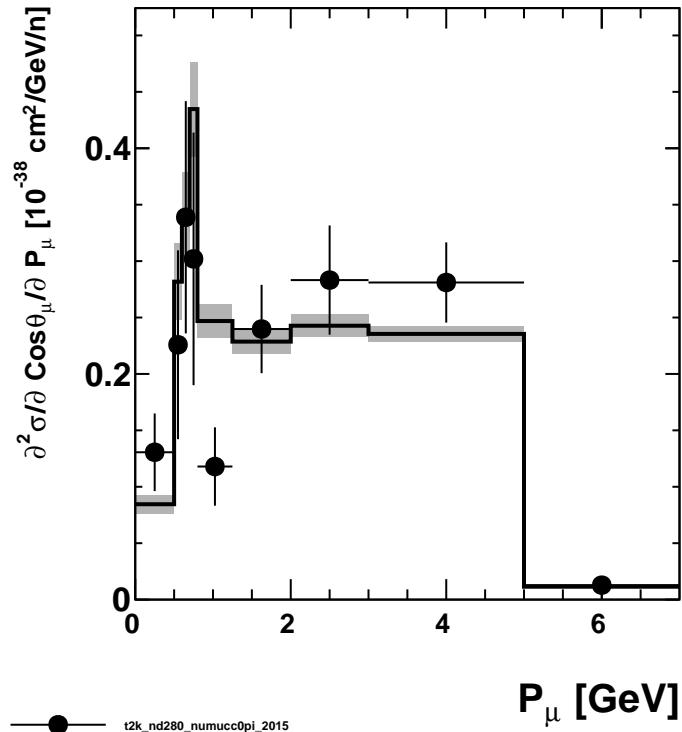
t2k\_nd280\_numucc0pi\_2015

master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 11.3/8$  DoF

t2k\_nd280\_numucc0pi\_2015

master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 6.13/11$  DoF

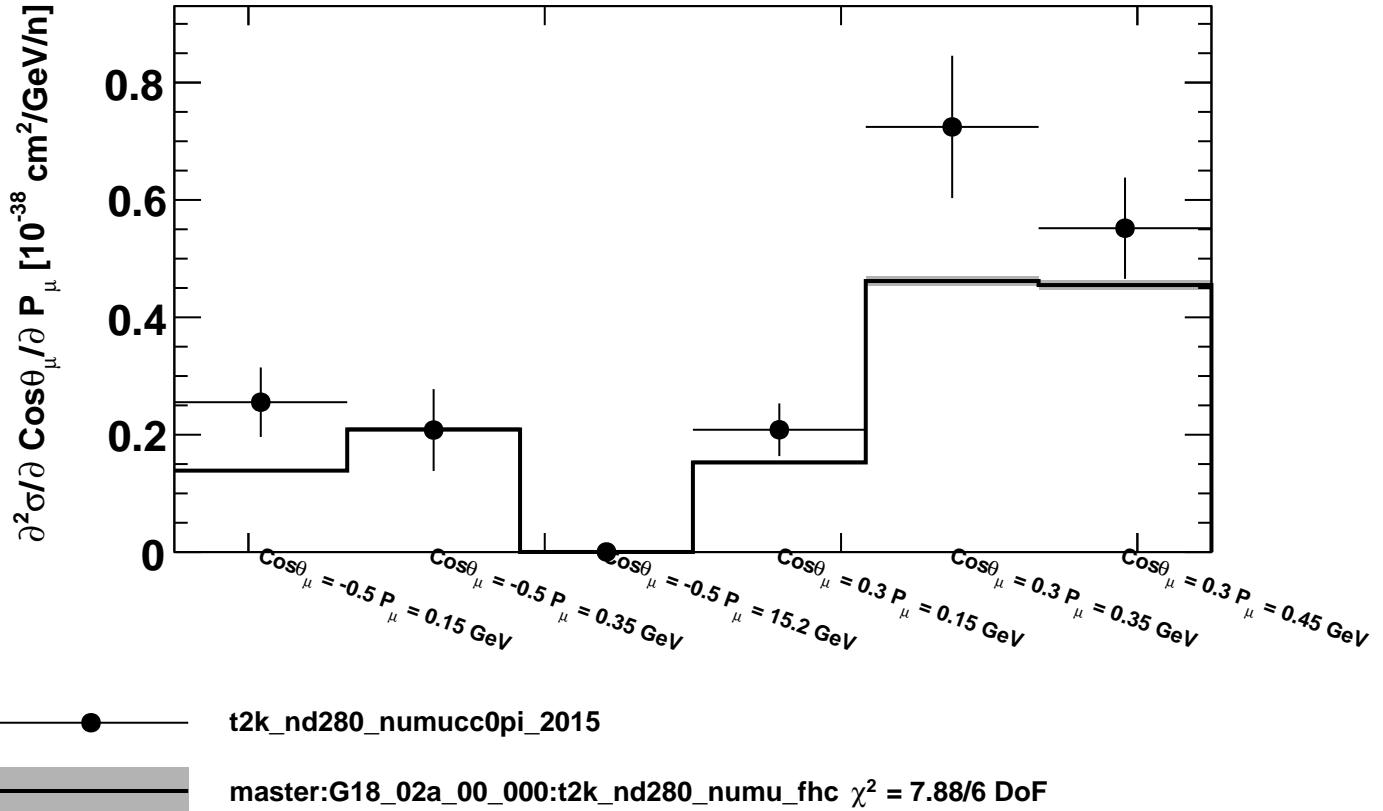
$\text{Cos}\theta_\mu \in [0.98; 1]$



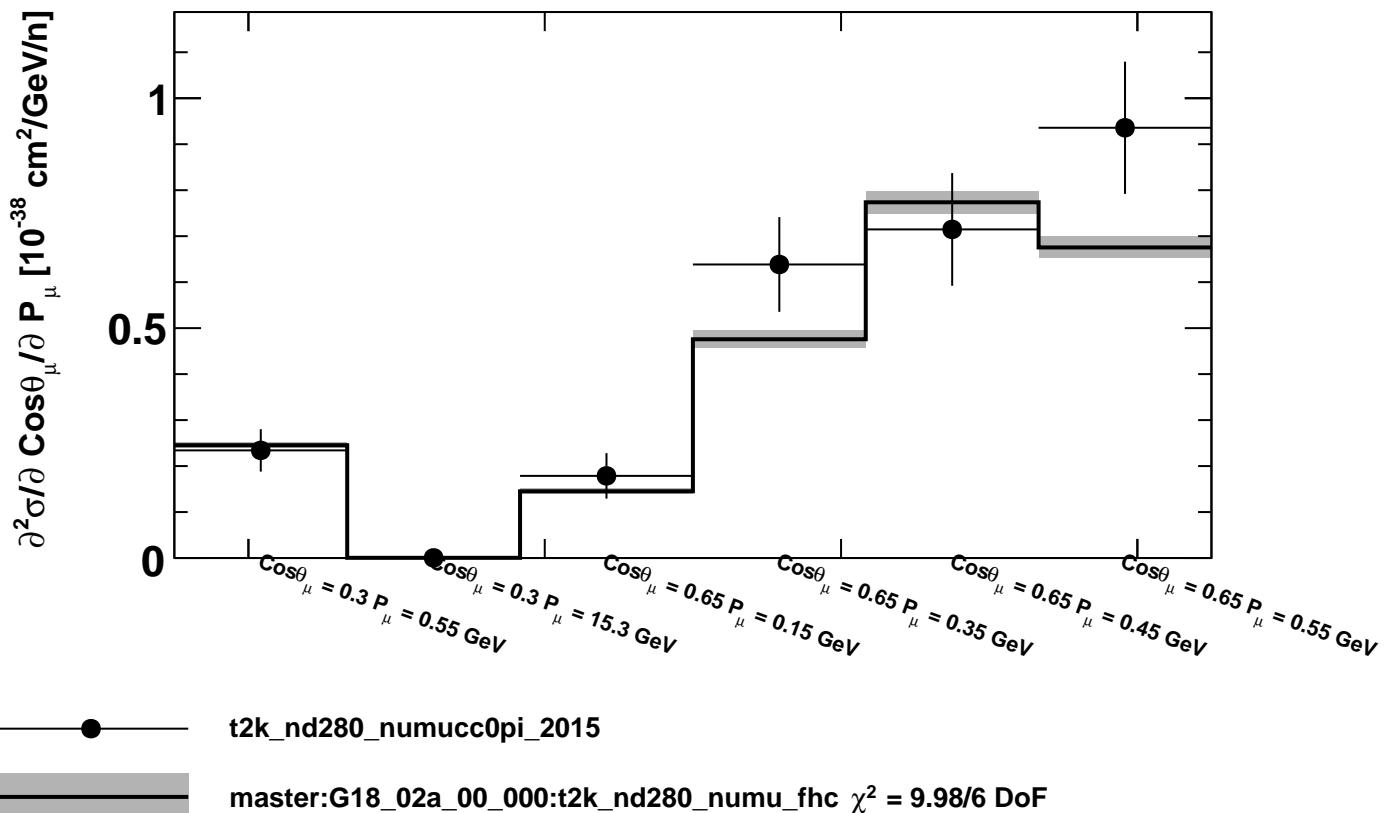
master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc  $\chi^2 = 26.4/9$  DoF



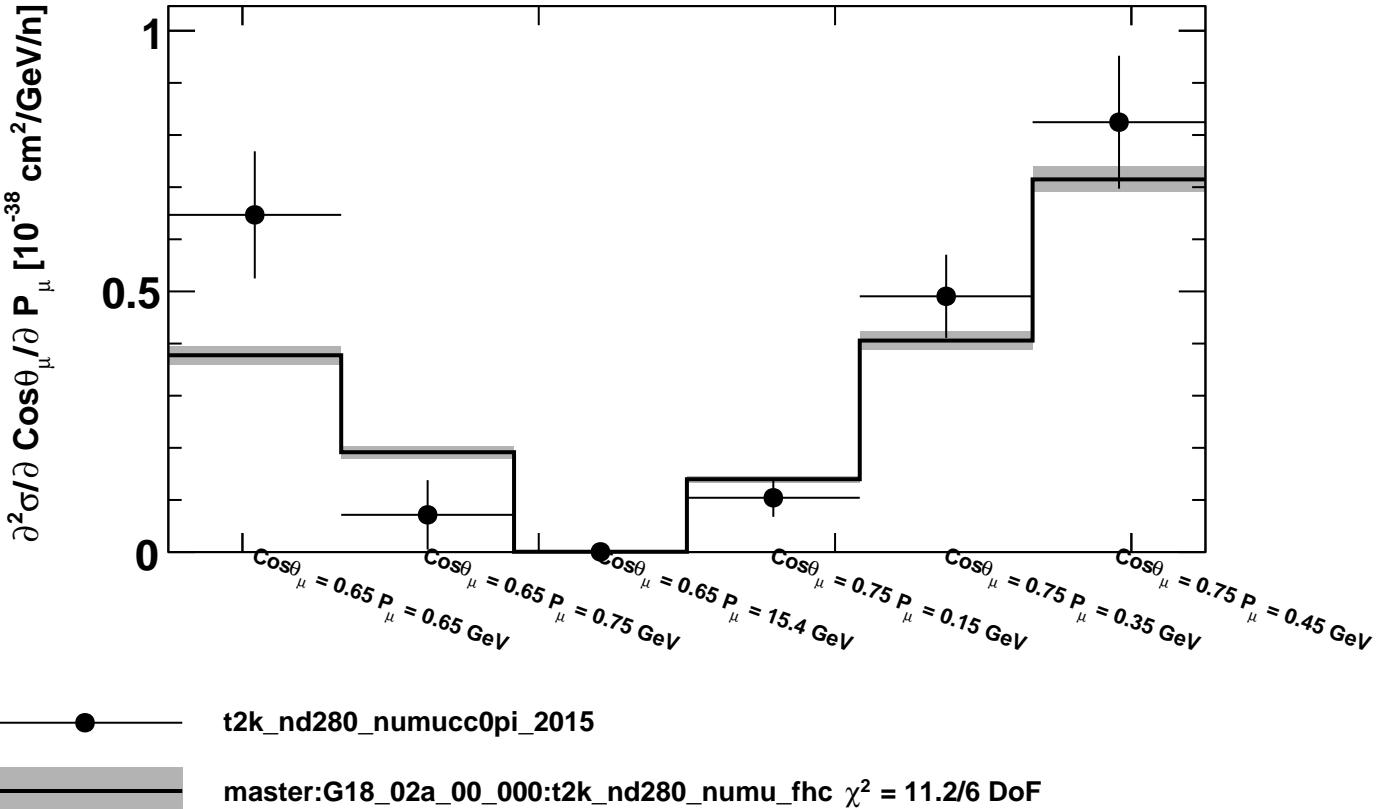
Bin  $\in [0; 5]$



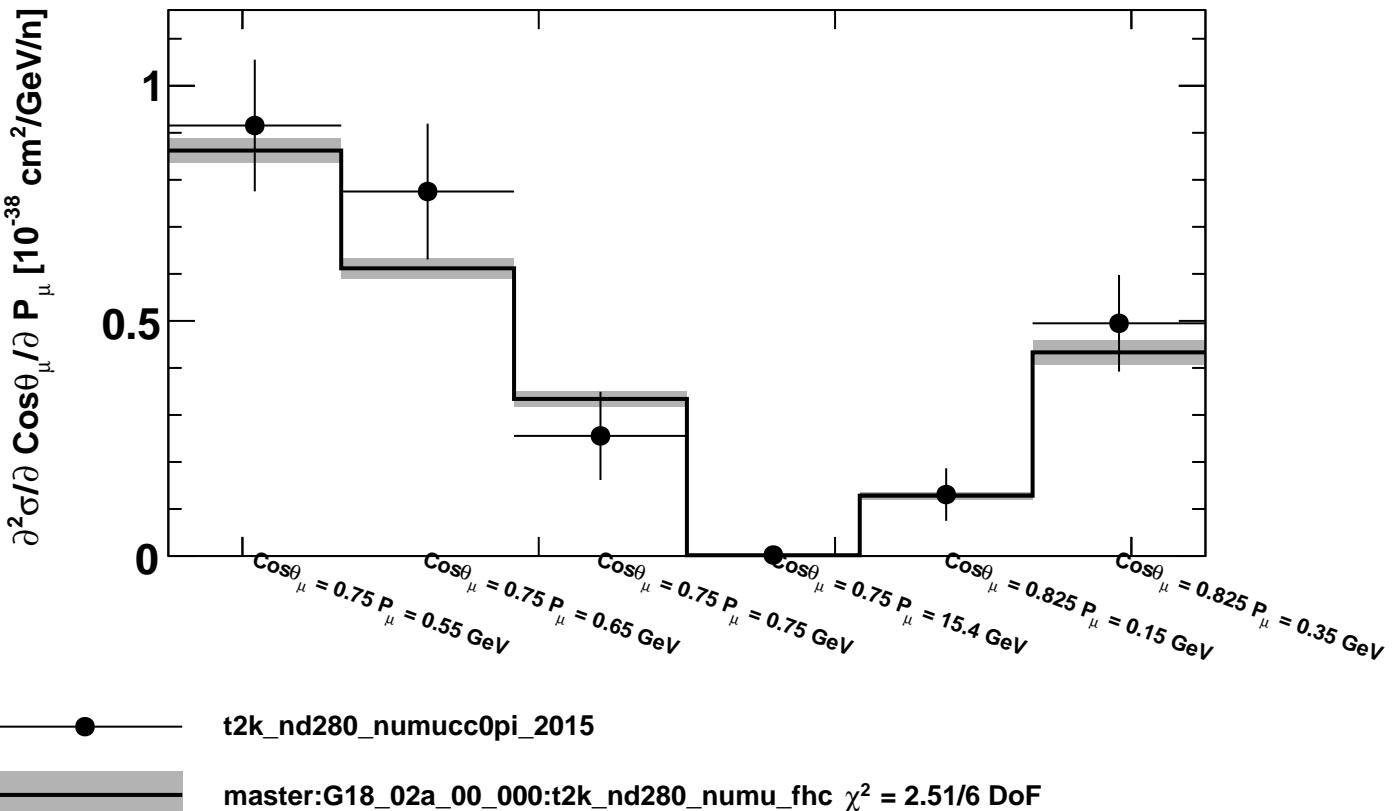
Bin  $\in [6; 11]$



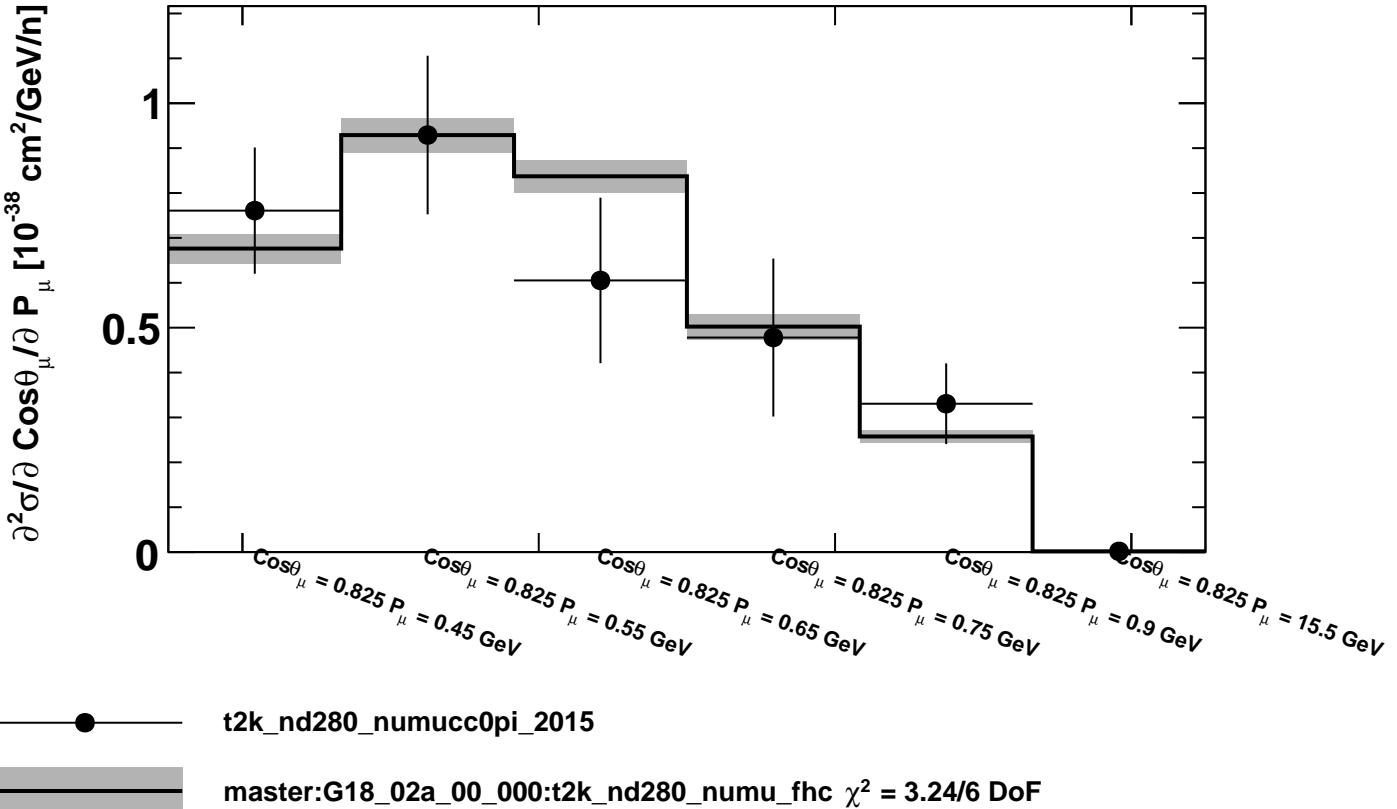
Bin  $\in [12; 17]$



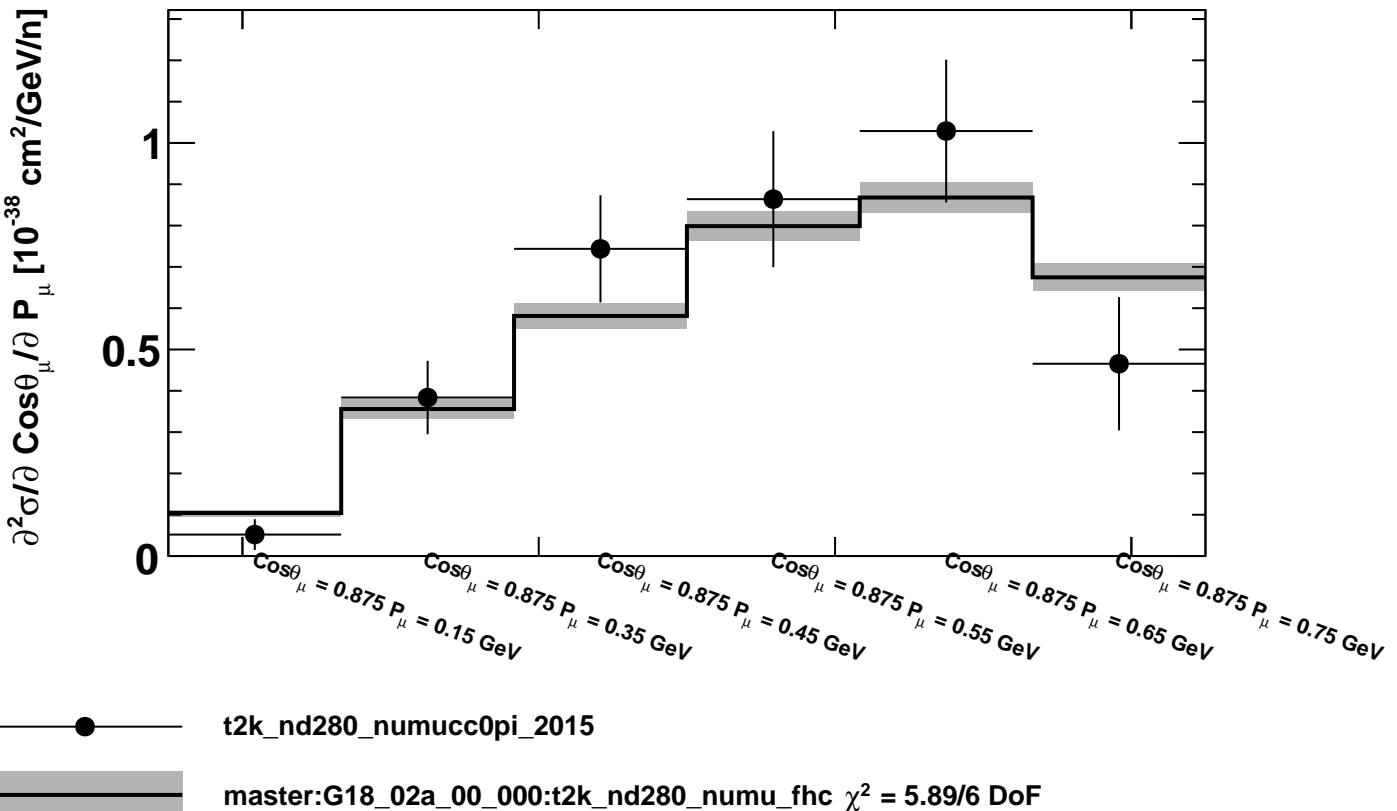
Bin  $\in [18; 23]$



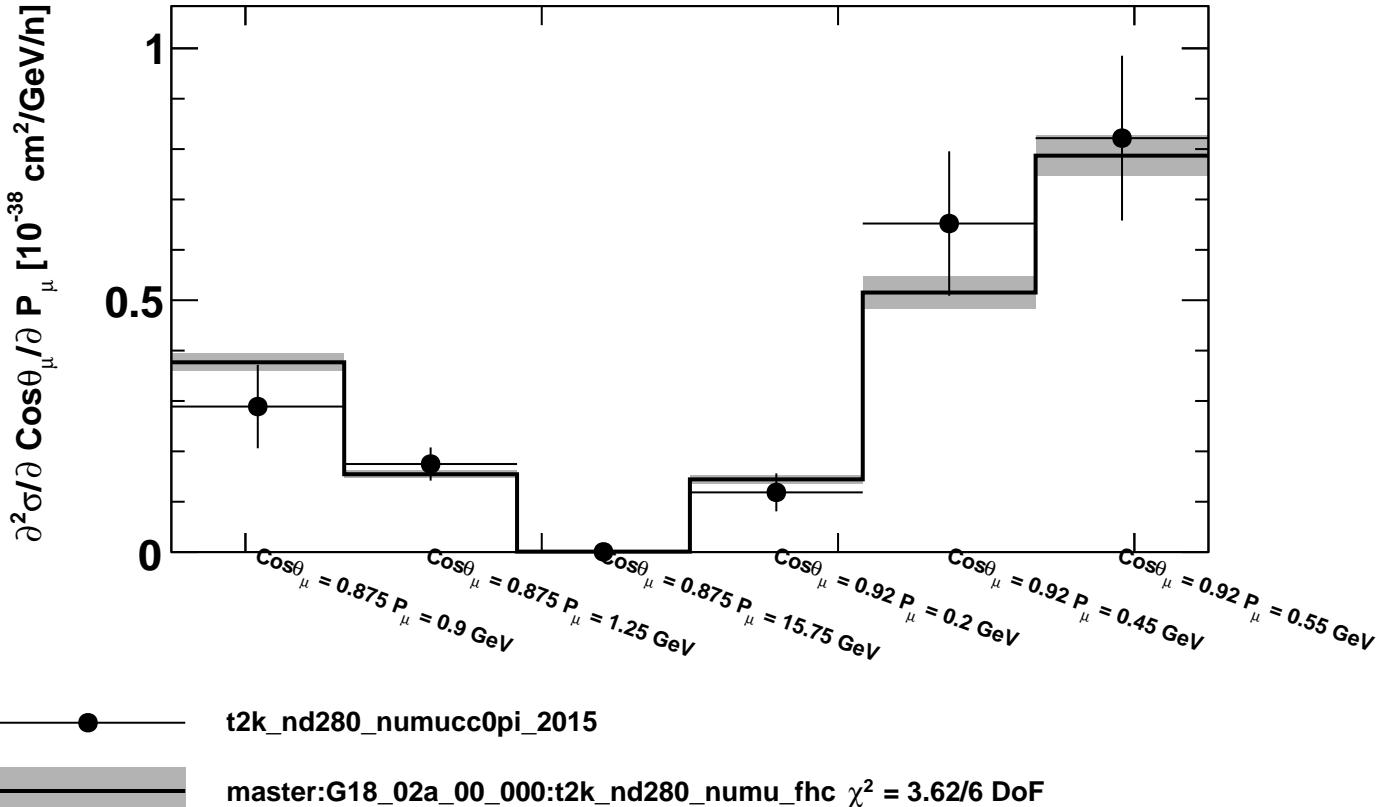
Bin  $\in [ 24; 29 ]$



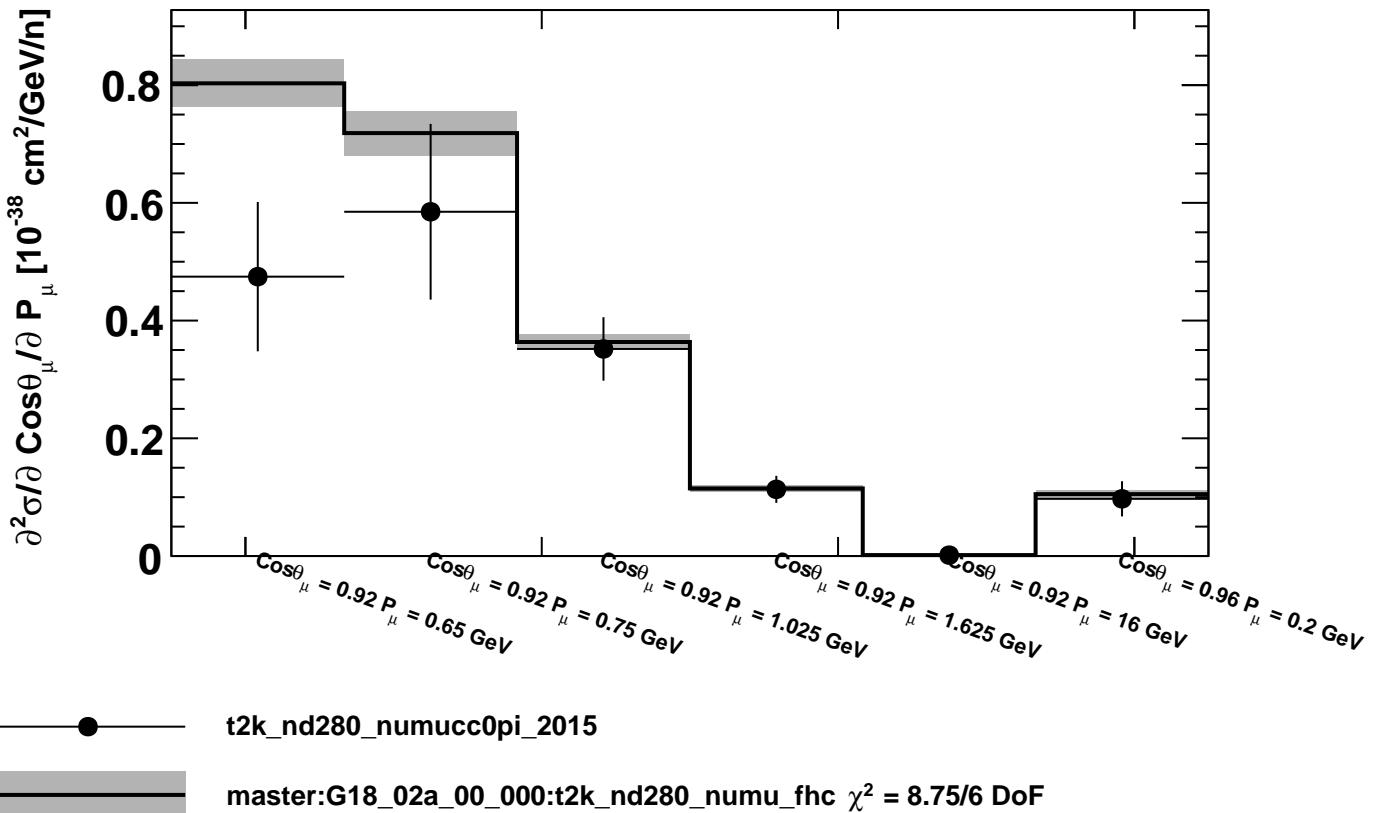
Bin  $\in [ 30; 35 ]$



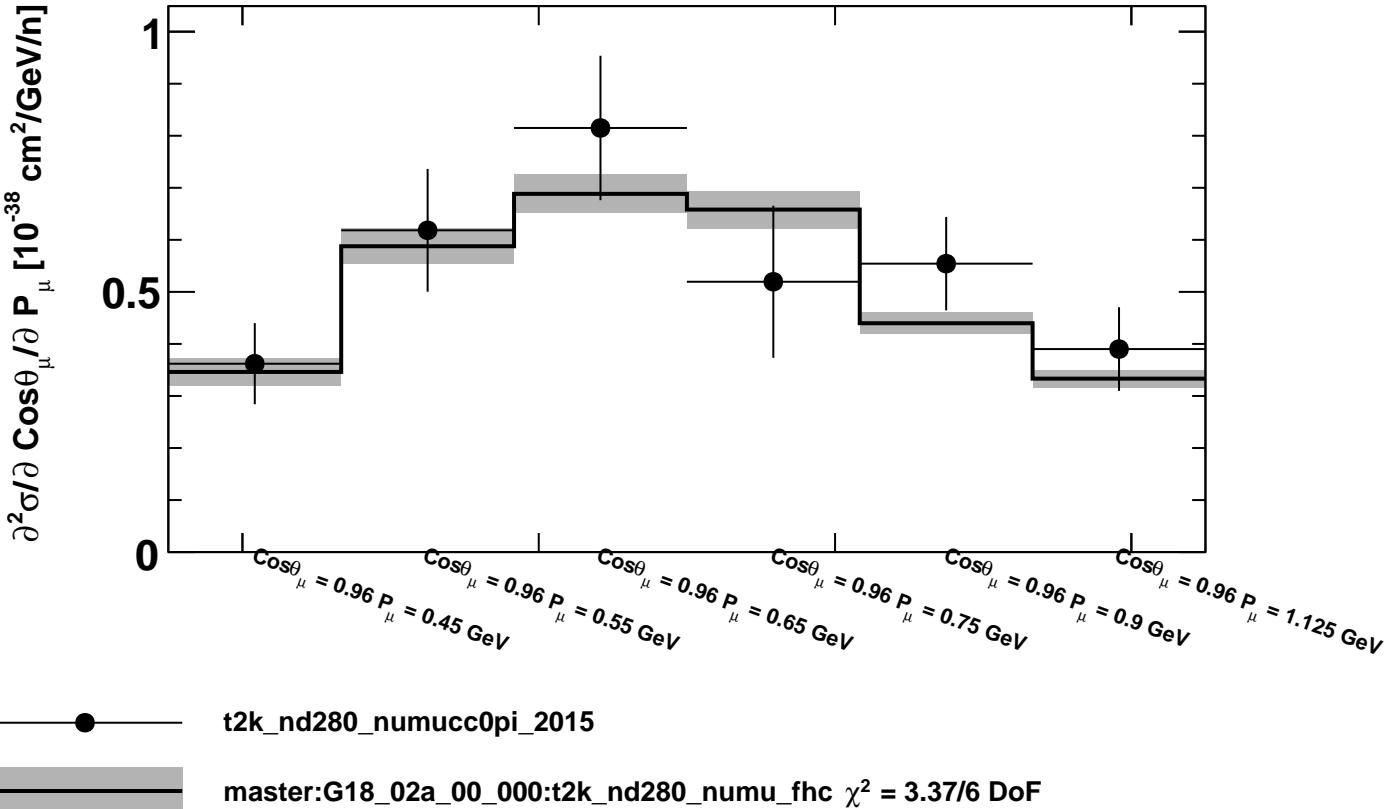
Bin  $\in [36; 41]$



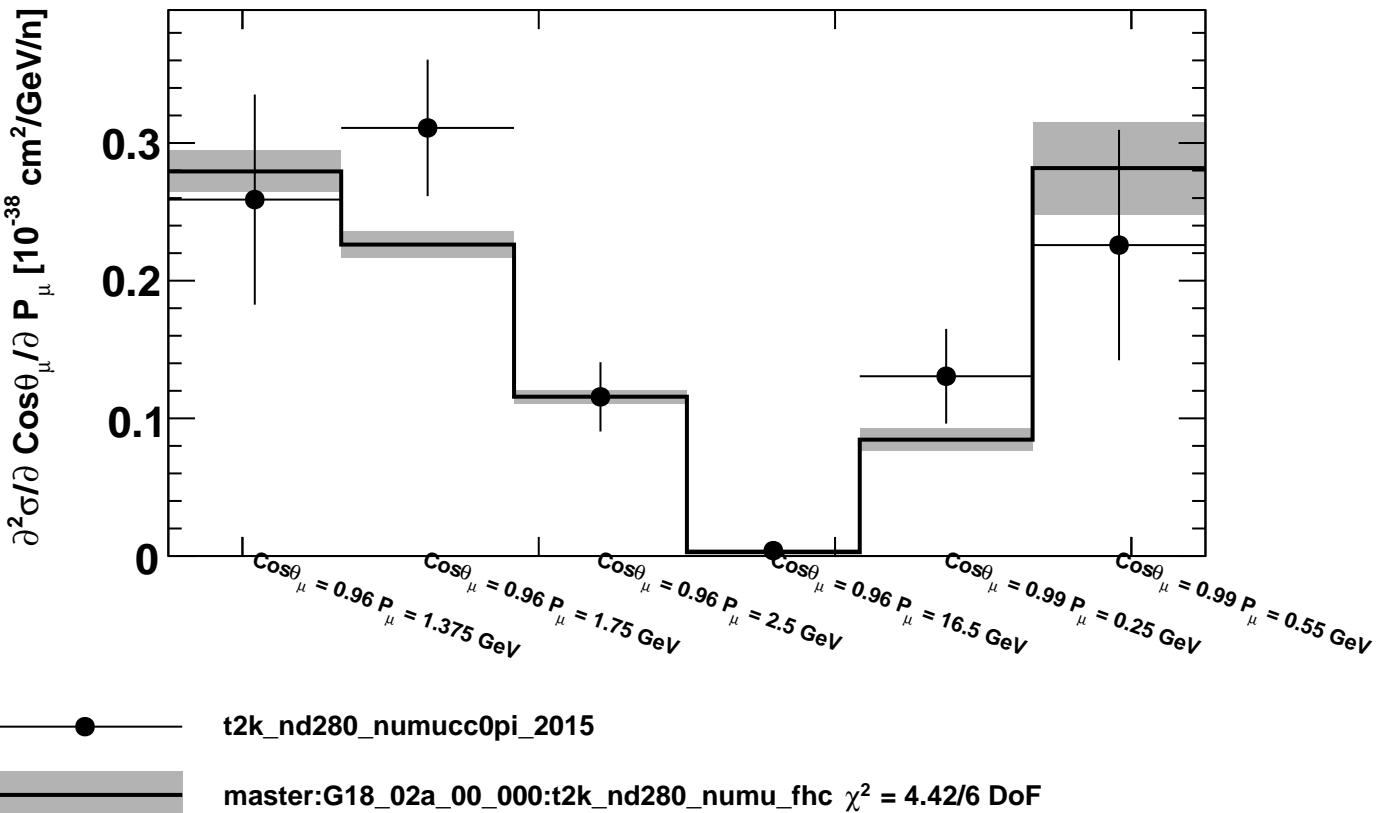
Bin  $\in [42; 47]$



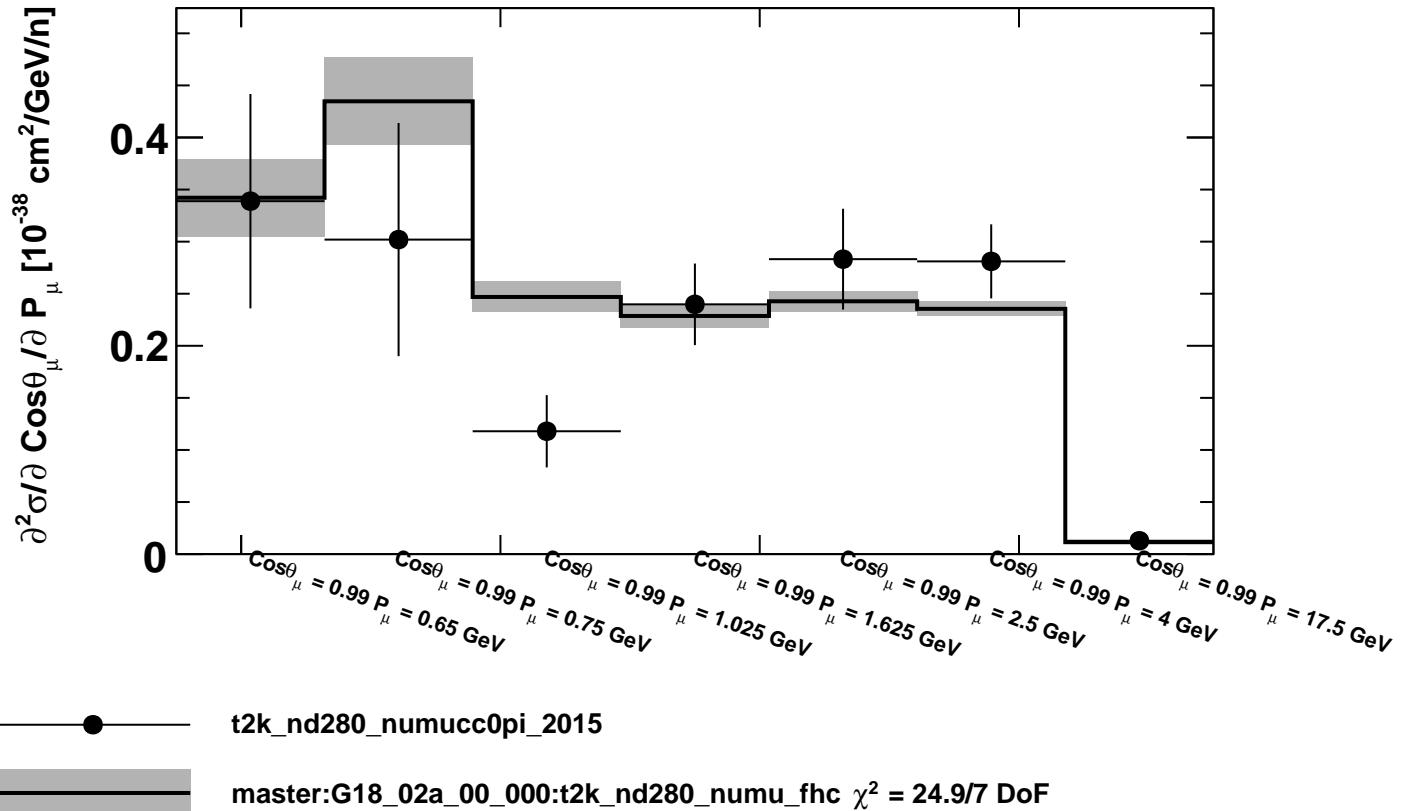
Bin  $\in [48; 53]$



Bin  $\in [54; 59]$



Bin  $\in [60; 66]$



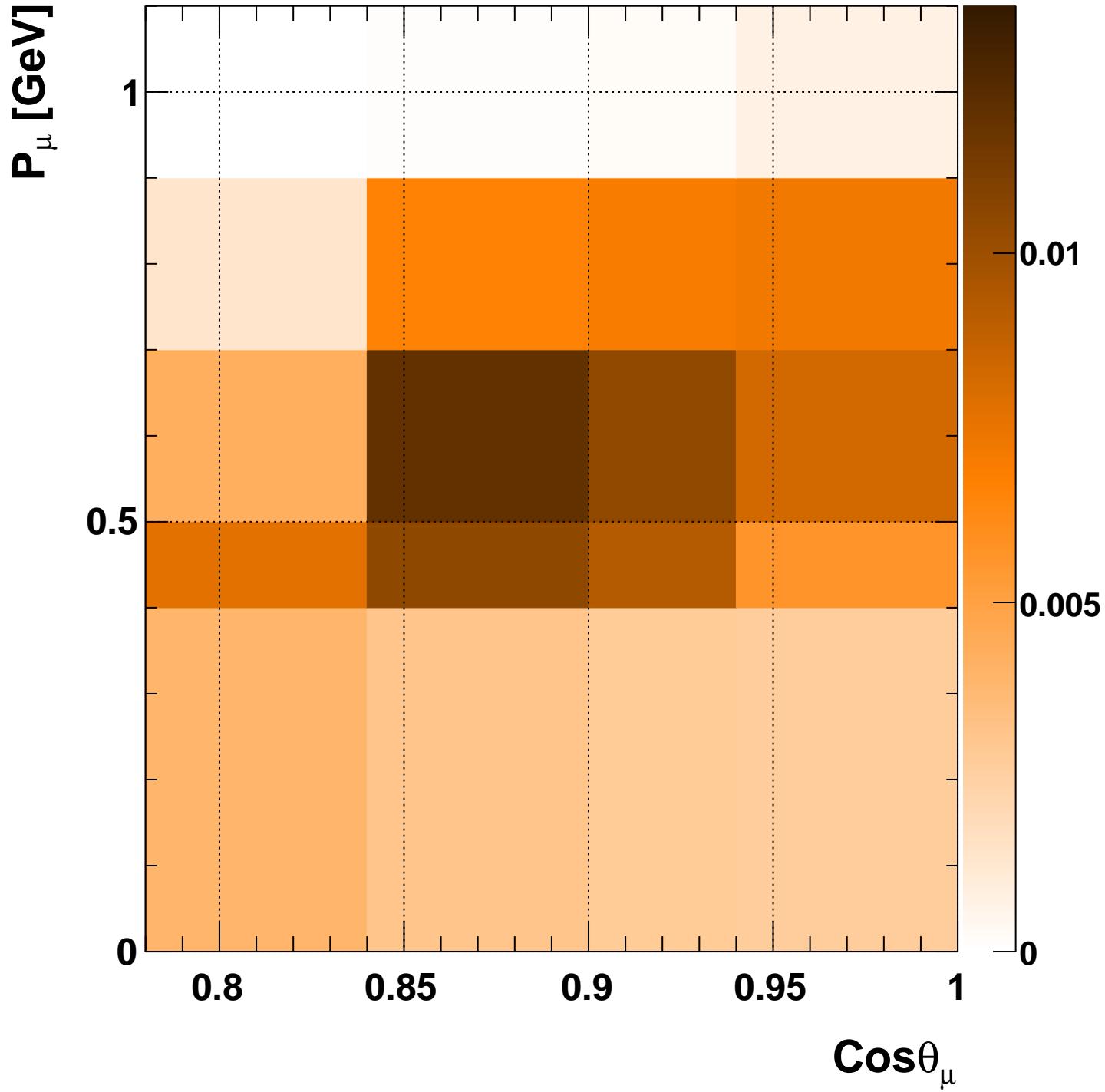
**Dataset:**  
**t2k\_nd280\_numucc\_2013**

**Model:**  
**master/G18\_02a\_00\_000  $\chi^2 = 36.5 / 20$  DoF**

**Plot:**  
 $\partial^2\sigma/\partial \text{Cos}\theta_\mu \partial P_\mu$   
**20 DoF,  $\chi^2 = 36.5$**

**2018/10/15 09:40:43**

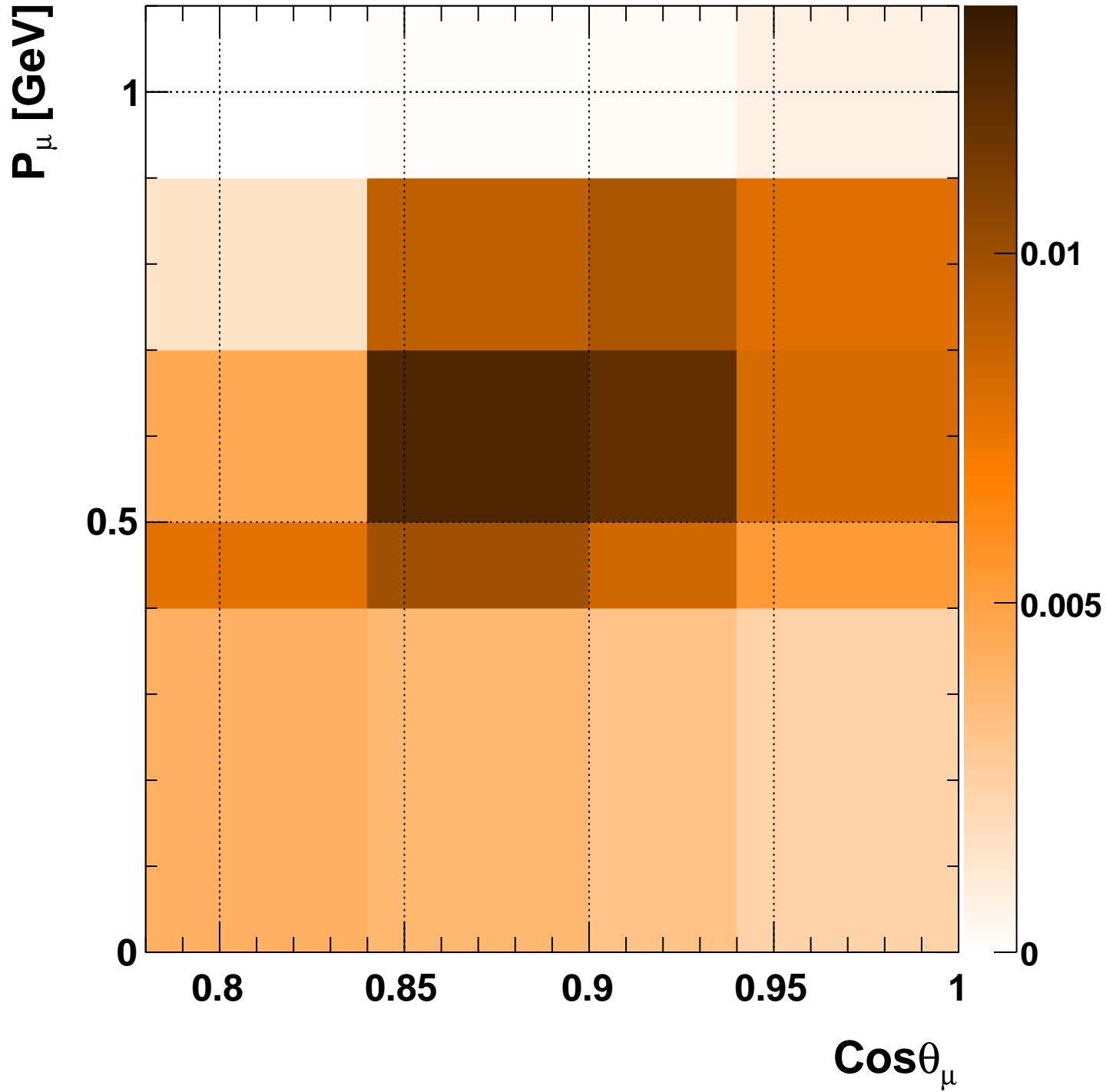
© 2003-2018, GENIE - <http://www.genie-mc.org>



$d^2\sigma/d\cos\theta_\mu dP_\mu [10^{-38} \text{ cm}^2/\text{GeV}]$

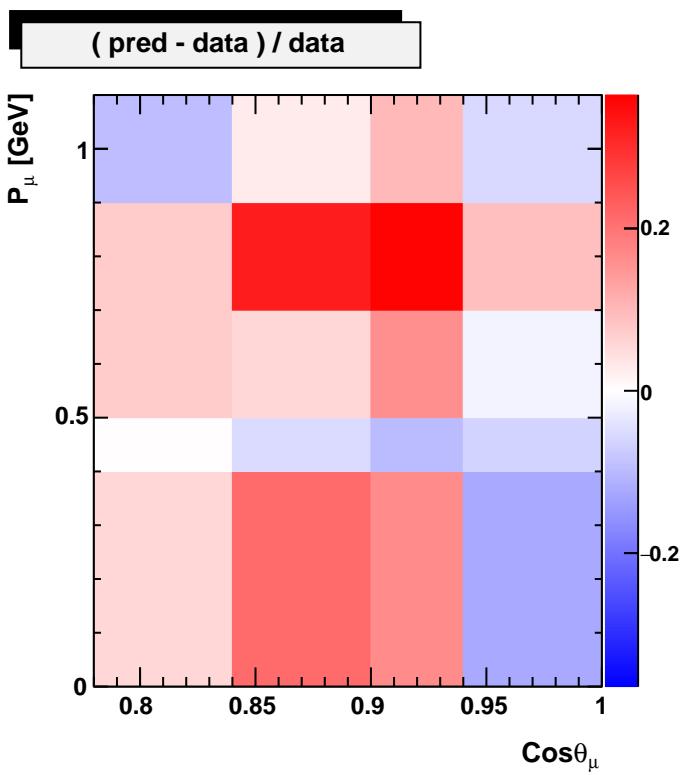
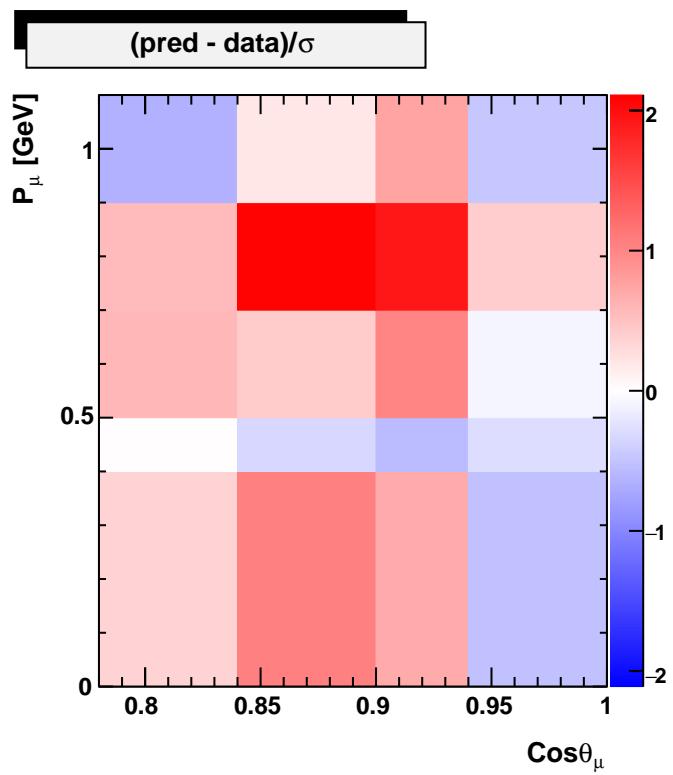
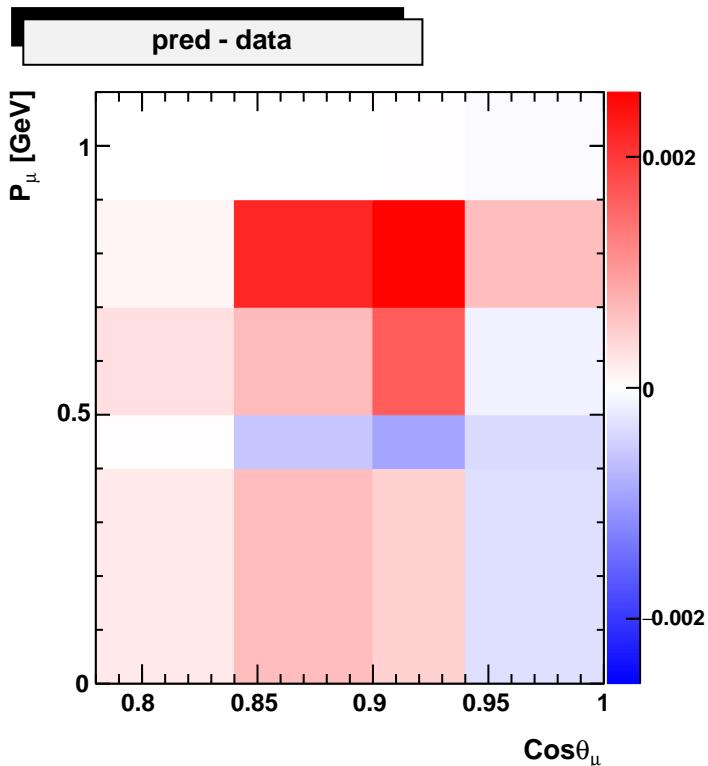
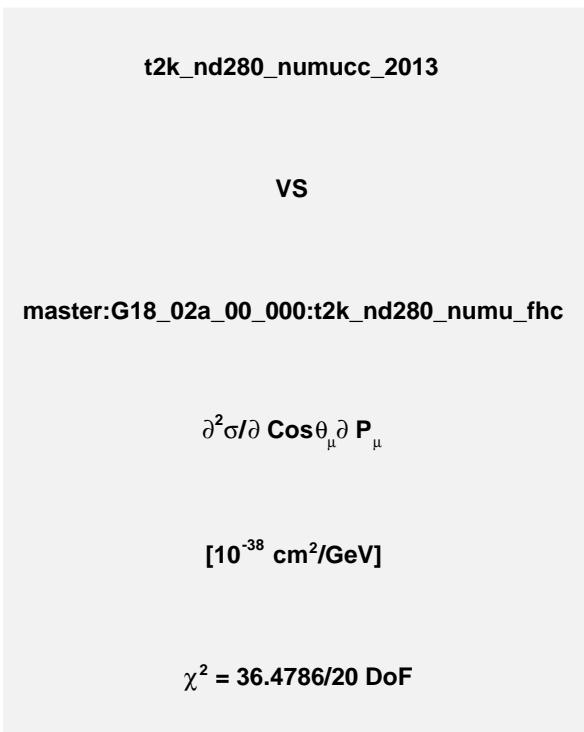
Data: t2k\_nd280\_numucc\_2013

© 2003-2018, GENIE - <http://www.genie-mc.org>

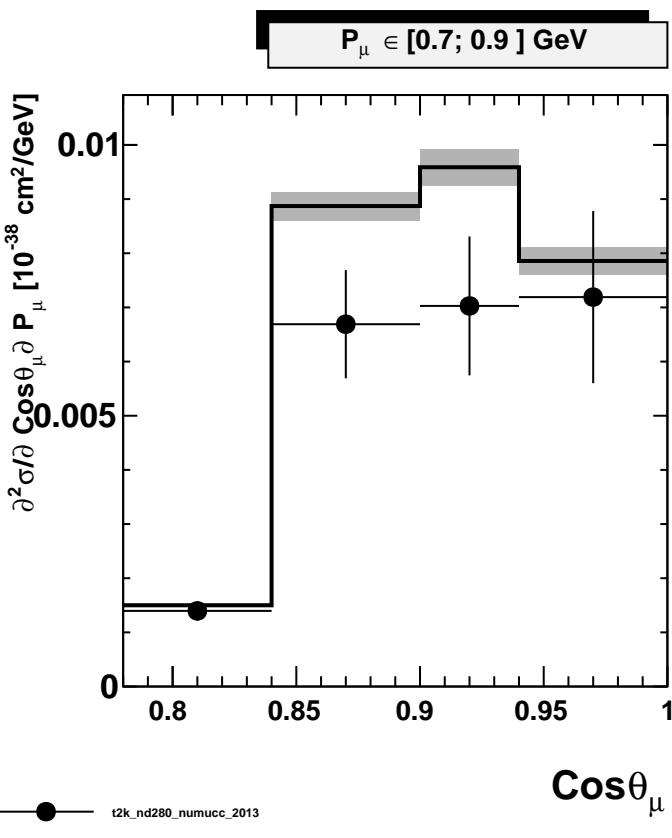
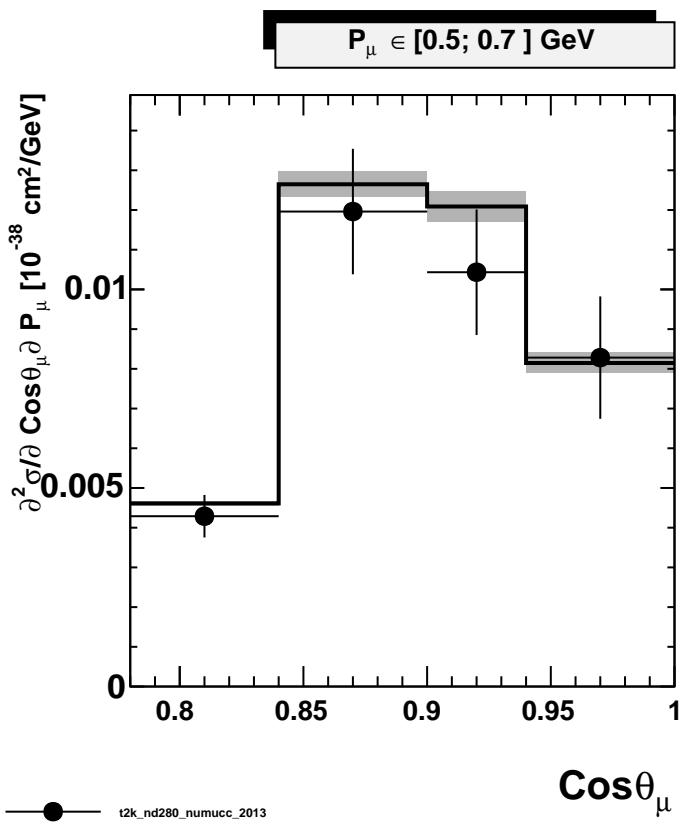
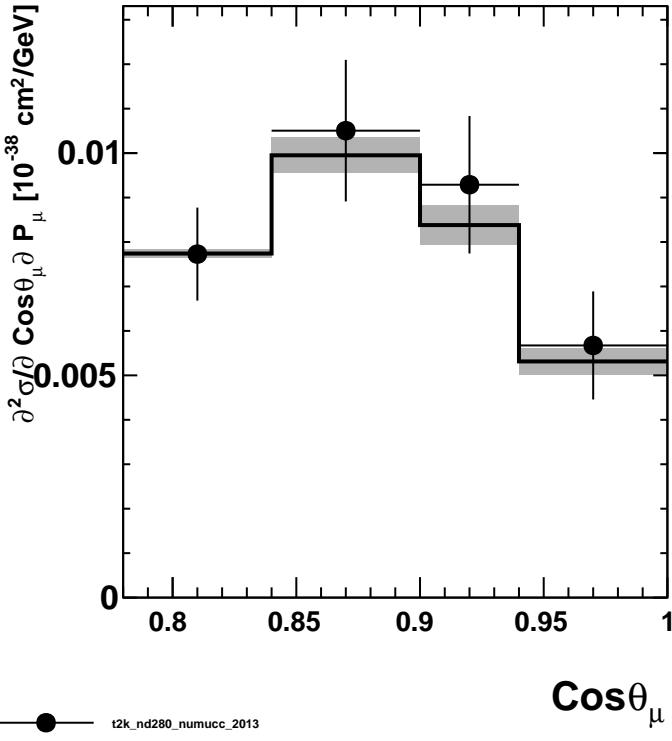
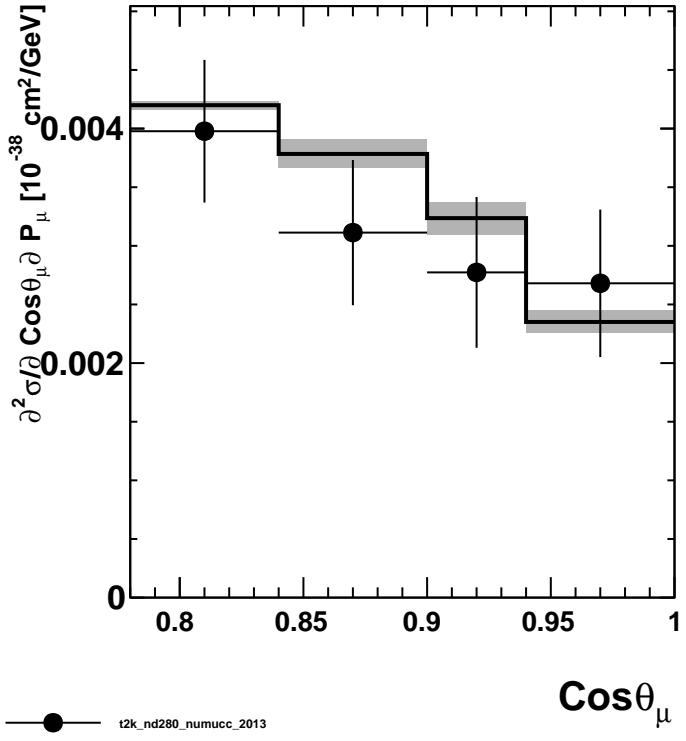


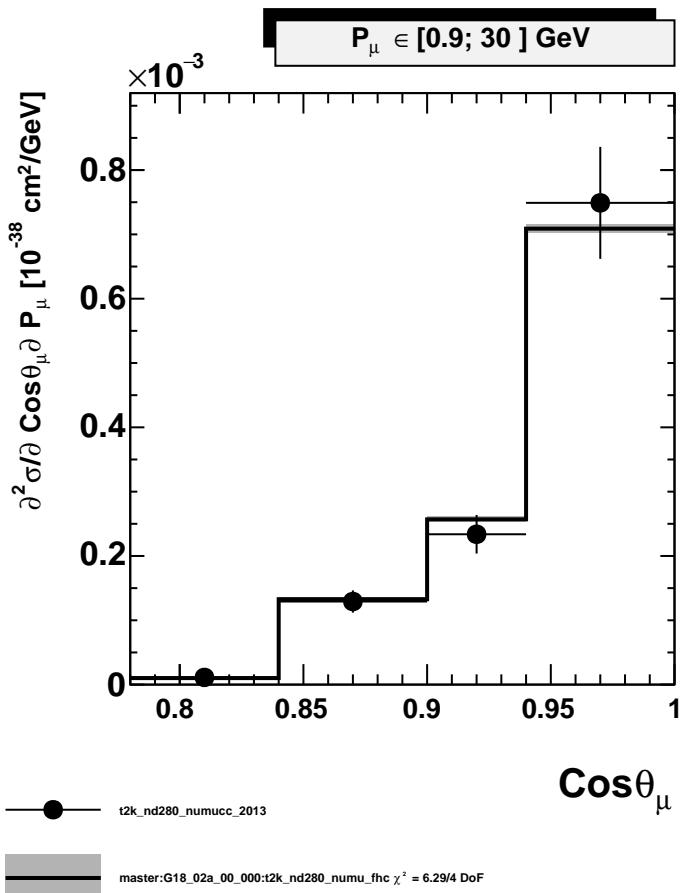
$$\frac{\partial^2 \sigma}{\partial \cos\theta_\mu \partial P_\mu} [10^{-38} \text{ cm}^2/\text{GeV}]$$

Pred: master:G18\_02a\_00\_000:t2k\_nd280\_numu\_fhc

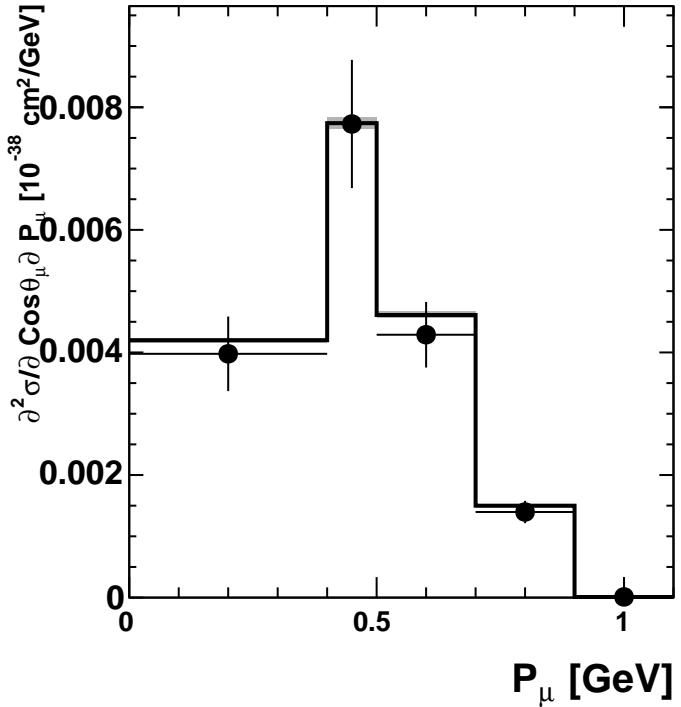
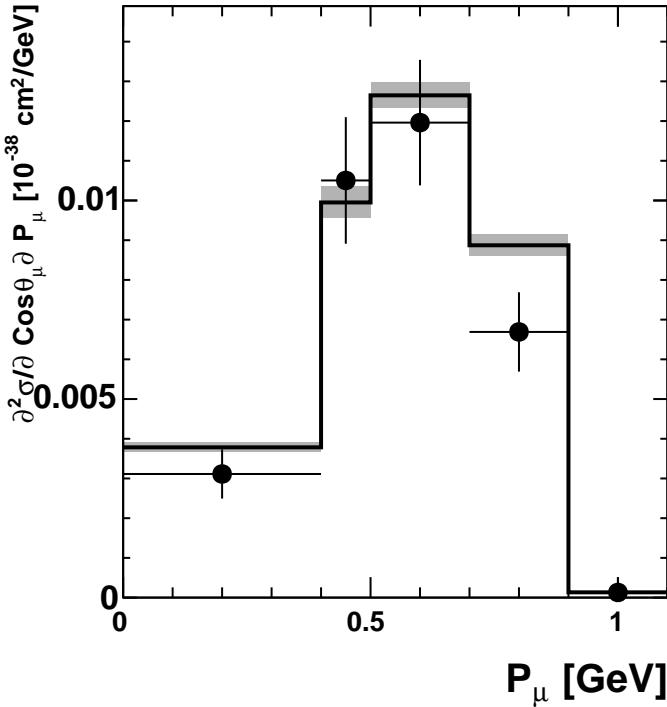
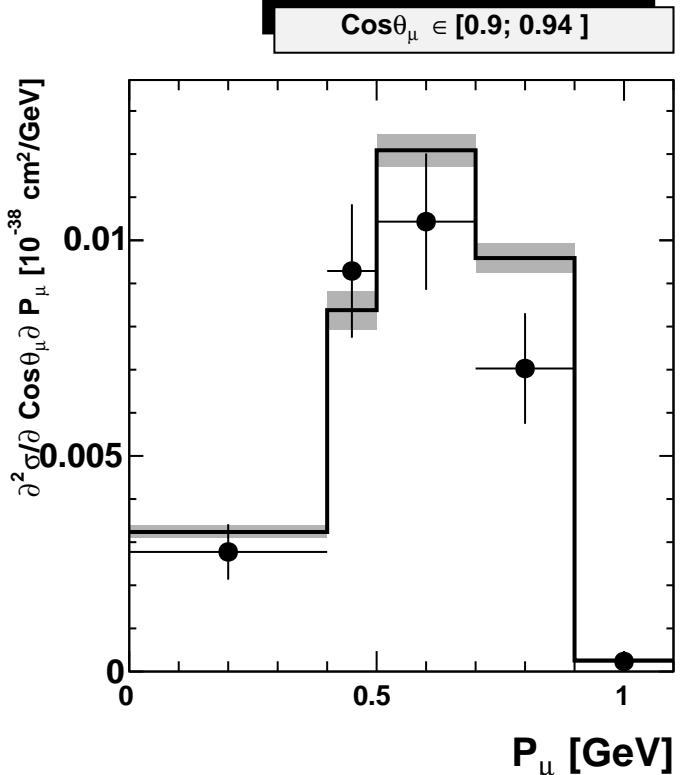




$P_\mu \in [0; 0.4] \text{ GeV}$  $P_\mu \in [0.4; 0.5] \text{ GeV}$ 





$\text{Cos}\theta_\mu \in [0; 0.84]$  $\text{Cos}\theta_\mu \in [0.84; 0.9]$  $\text{Cos}\theta_\mu \in [0.9; 0.94]$  $\text{Cos}\theta_\mu \in [0.94; 1]$ 