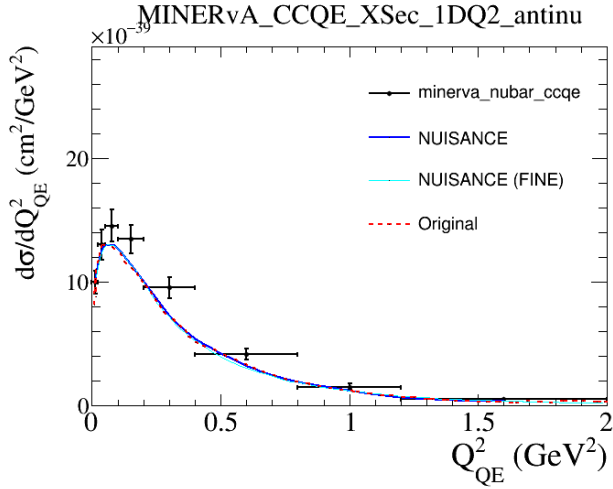


MINERvA\_CCQE\_XSec\_1DQ2\_nu\_settings

```

• name : MINERvA_CCQE_XSec_1DQ2_nu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_fhc_numu.CH.2500000.1.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CCQE_XSec_1DQ2_nu sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current Numu
  |--> Signal: True CCQE/2p2h defined at the vertex level
• xtitle : Q²QE (GeV²)
• ytitle : dσ/dQ² (cm²/GeV²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 10
• title : MINERvA_CCQE_XSec_1DQ2_nu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQE
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQ
• originalname : MINERvA_CCQE_XSec_1DQ2_nu
• χ² : 19.3218
• NDOF : 8
• χ²/NDOF : 2.41522

```

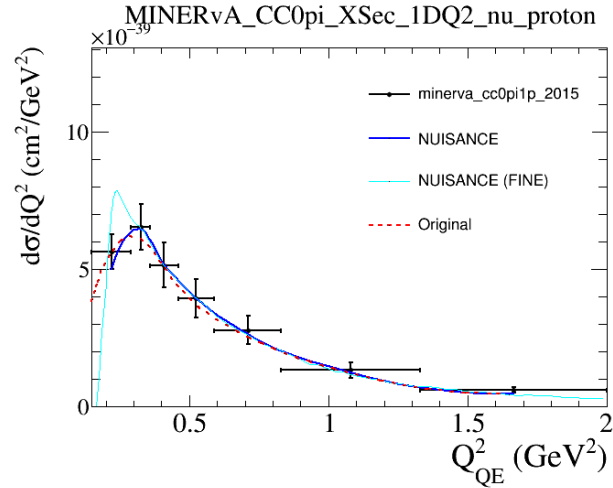


MINERvA\_CCQE\_XSec\_1DQ2\_antinu\_settings

```

• name : MINERvA_CCQE_XSec_1DQ2_antinu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_rhc_numubar.CH.2500000.2.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CCQE_XSec_1DQ2_antinu sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current Numubar
  |--> Signal: True CCQE/2p2h defined at the vertex level
• xtitle : Q²QE (GeV²)
• ytitle : dσ/dQ² (cm²/GeV²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 10
• title : MINERvA_CCQE_XSec_1DQ2_antinu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQE
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQ
• originalname : MINERvA_CCQE_XSec_1DQ2_antinu
• χ² : 19.9113
• NDOF : 8
• χ²/NDOF : 2.48891

```

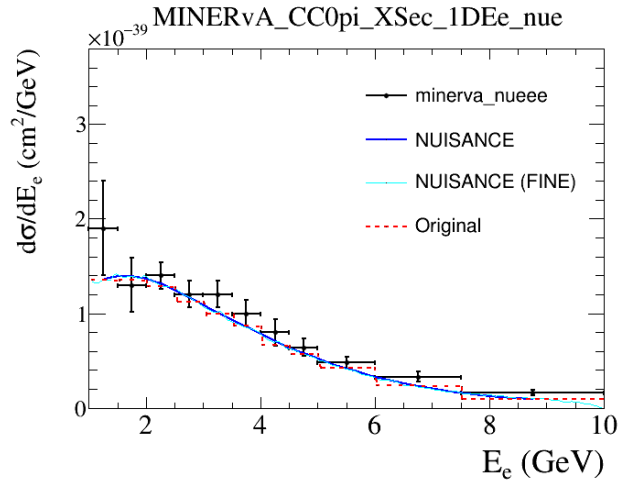


MINERvA\_CC0pi\_XSec\_1DQ2\_nu\_proton\_settings

```

• name : MINERvA_CC0pi_XSec_1DQ2_nu_proton
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_fhc_numu.CH.2500000.1.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CC0pi_XSec_1DQ2_nu_proton sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current nue + nuebar
  |--> Signal: Any event with 1 electron, any nucleons, and no other FS particles
• xtitle : Q²QE (GeV²)
• ytitle : dσ/dQ² (cm²/GeV²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 0
• enu_max : 100
• title : MINERvA_CC0pi_XSec_1DQ2_nu_proton
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQE
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCQ
• originalname : MINERvA_CC0pi_XSec_1DQ2_nu_proton
• χ² : 7.63844
• NDOF : 7
• χ²/NDOF : 1.09121

```

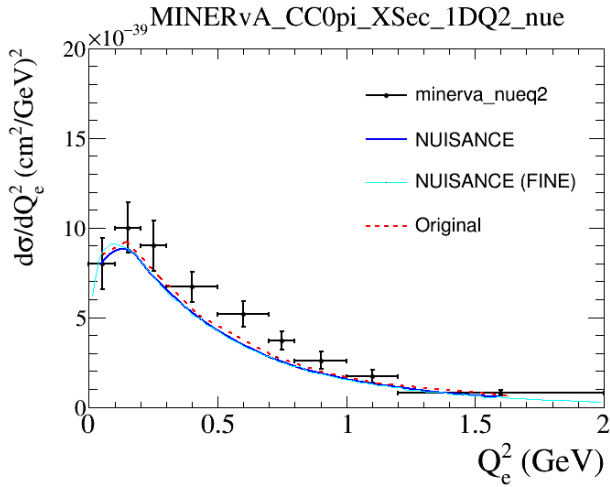


MINERvA\_CC0pi\_XSec\_1DEe\_nue\_settings

```

• name : MINERvA_CC0pi_XSec_1DEe_nue
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_fhc_nue.CH.2500000.3.prepared.n
• type : DEFAULT
• description :
  |--> MINERvA CC0pi nue Ee sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current nue + nuebar
  |--> Signal: Any event with 1 electron, any nucleons, and no other FS particles
• xtitle : Ee (GeV)
• ytitle : dσ/dEe (cm²/GeV)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 0
• enu_max : 10
• title : MINERvA v_e CC0π
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC0pi
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC0p
• originalname : MINERvA_CC0pi_XSec_1DEe_nue
• χ² : 0.95264
• NDOF : 11
• χ²/NDOF : 0.0866036

```

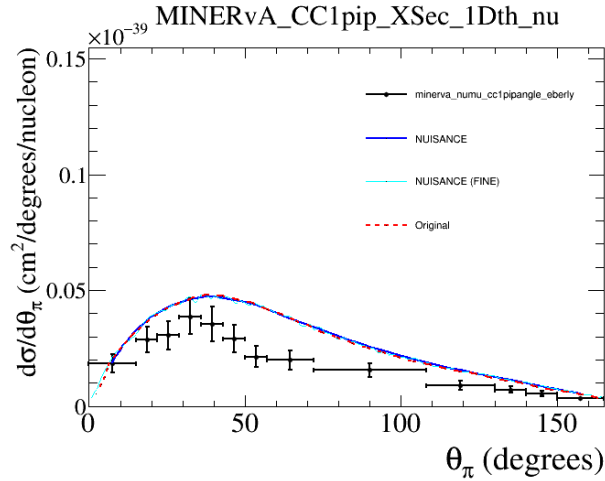


MINERvA\_CC0pi\_XSec\_1DQ2\_nue\_settings

```

• name : MINERvA_CC0pi_XSec_1DQ2_nue
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_fhc_nue.CH.2500000.3.prepared.n
• type : DEFAULT
• description :
  |--> MINERvA CC0pi_XSec_1DQ2_nue sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current nue + nuebar
  |--> Signal: Any event with 1 electron, any nucleons, and no other FS particles
• xtitle : Q² (GeV²)
• ytitle : dσ/dQ² (cm²/GeV²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 0
• enu_max : 10
• title : MINERvA_CC0pi_XSec_1DQ2_nue
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC0pi
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC0p
• originalname : MINERvA_CC0pi_XSec_1DQ2_nue
• χ² : 0.99699
• NDOF : 9
• χ²/NDOF : 0.110777

```

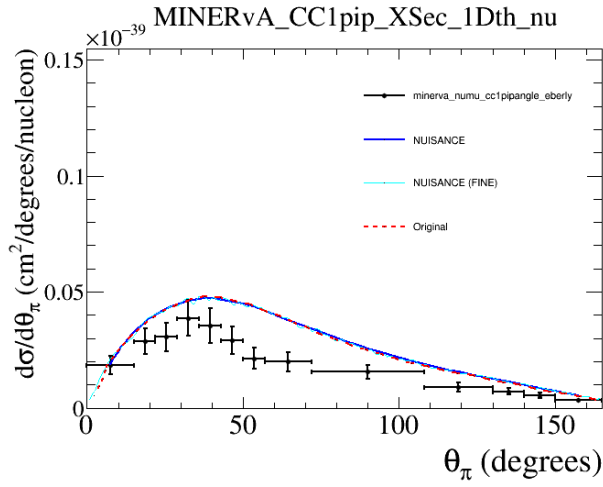


MINERvA\_CC1pip\_XSec\_1Dth\_nu\_settings

```

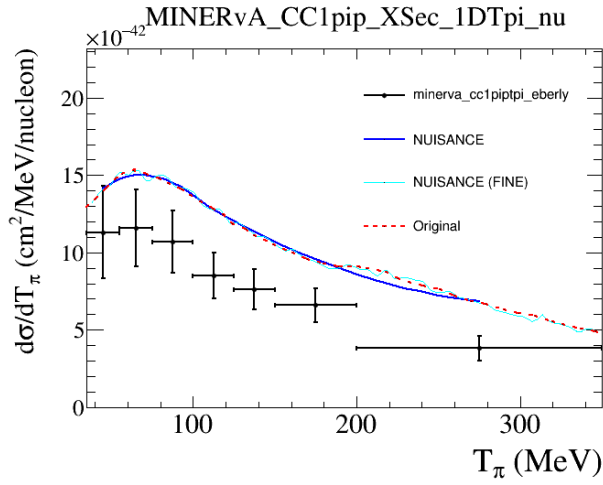
• name : MINERvA_CC1pip_XSec_1Dth_nu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_fhc_numu.CH.2500000.1.prepared
• type : DEFAULT
• description :
  |--> MINERvA CC1pip_XSec_1Dth_nu sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current nue + nuebar
  |--> Signal: Any event with 1 electron, any nucleons, and no other FS particles
• xtitle : θπ (degrees)
• ytitle : dσ/dθπ (cm²/degrees/nucleon)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 10
• title : MINERvA_CC1pip_XSec_1Dth_nu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1p
• originalname : MINERvA_CC1pip_XSec_1Dth_nu
• χ² : 104.614
• NDOF : 13
• χ²/NDOF : 8.04719

```



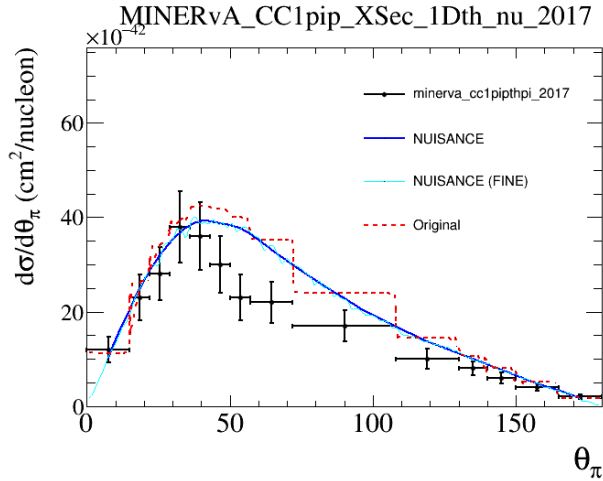
MINERvA\_CC1pip\_XSec\_1Dth\_nu\_settings

- **name** : MINERvA\_CC1pip\_XSec\_1Dth\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳-> MINERvA\_CC1pip\_XSec\_1Dth\_nu sample.  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current nue + nuubar  
 ↳-> Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $\theta_\pi$  (degrees)
- **ytitle** :  $d\sigma/d\theta_\pi$  (cm<sup>2</sup>/degrees/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CC1pip\_XSec\_1Dth\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **originalname** : MINERvA\_CC1pip\_XSec\_1Dth\_nu
- $\chi^2$  : 104.614
- **NDOF** : 13
- $\chi^2/\text{NDOF}$  : 8.04719



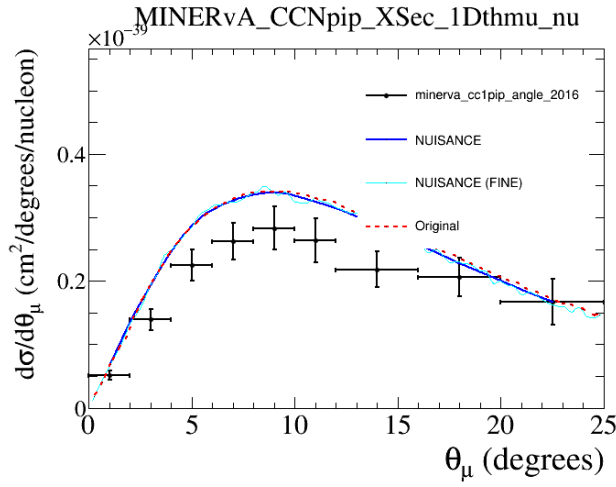
MINERvA\_CC1pip\_XSec\_1DTpi\_nu\_settings

- **name** : MINERvA\_CC1pip\_XSec\_1DTpi\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳-> MINERvA\_CC1pip\_XSec\_1DTpi\_nu sample.  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current nue + nuubar  
 ↳-> Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $T_\pi$  (MeV)
- **ytitle** :  $d\sigma/dT_\pi$  (cm<sup>2</sup>/MeV/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CC1pip\_XSec\_1DTpi\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **originalname** : MINERvA\_CC1pip\_XSec\_1DTpi\_nu
- $\chi^2$  : 22.0665
- **NDOF** : 7
- $\chi^2/\text{NDOF}$  : 3.15236



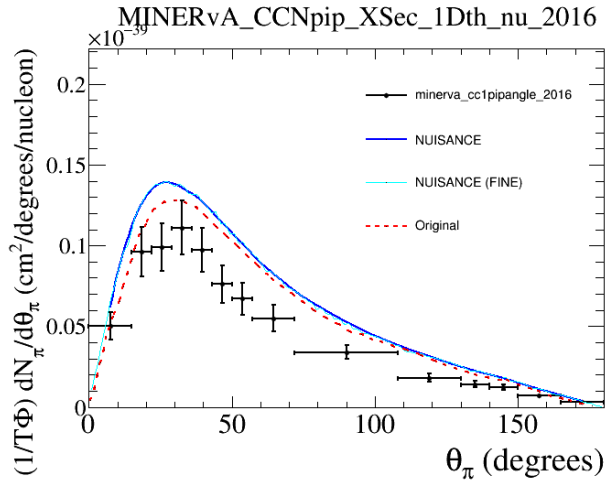
MINERvA\_CC1pip\_XSec\_1Dth\_nu\_2017\_settings

- **name** : MINERvA\_CC1pip\_XSec\_1Dth\_nu\_2017
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **description** :  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current numu ONLY  
 ↳-> Signal: Any event with 1 muon, and 1pi+ or 1pi- in FS. W < 1.4
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CC1pip
- **title** : CC1π Updated
- **xtitle** :  $\theta_\pi$
- **ytitle** :  $d\sigma/d\theta_\pi$  (cm<sup>2</sup>/nucleon)
- **originalname** : MINERvA\_CC1pip\_XSec\_1Dth\_nu\_2017
- $\chi^2$  : 77.0752
- **NDOF** : 14
- $\chi^2/\text{NDOF}$  : 5.50537



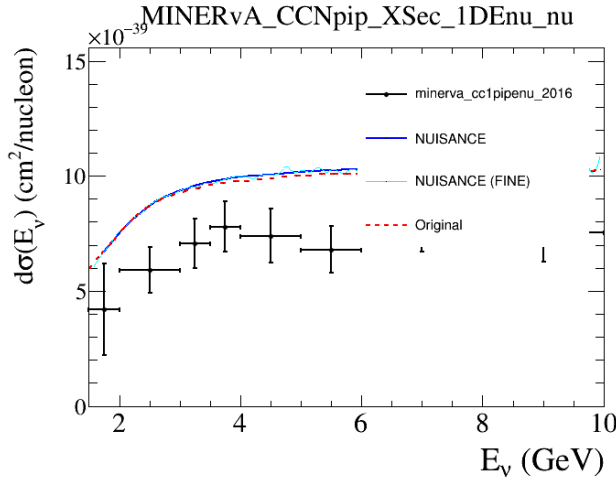
MINERvA\_CCNpip\_XSec\_1Dthmu\_nu\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1Dthmu\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1Dthmu\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuebar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $\theta_\mu$  (degrees)
- **ytitle** :  $d\sigma/d\theta_\mu$  (cm<sup>2</sup>/degrees/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1Dthmu\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCNp
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCN
- **originalname** : MINERvA\_CCNpip\_XSec\_1Dthmu\_nu
- $\chi^2$  : 20.2469
- **NDOF** : 9
- $\chi^2/\text{NDOF}$  : 2.24966



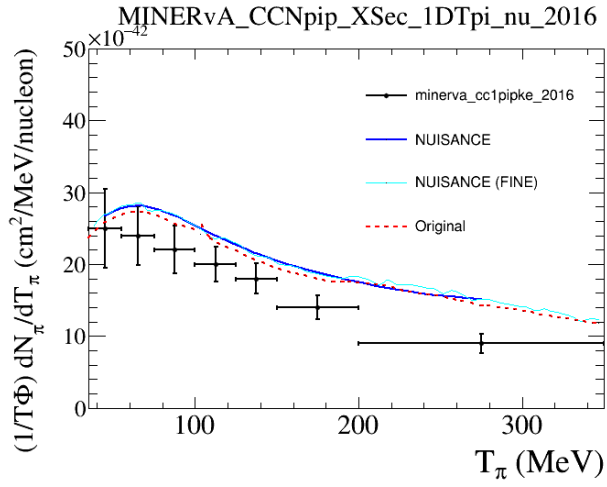
MINERvA\_CCNpip\_XSec\_1Dth\_nu\_2016\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1Dth\_nu\_2016
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1Dth\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuebar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $\theta_\pi$  (degrees)
- **ytitle** :  $(1/T\Phi) dN_\pi/d\theta_\pi$  (cm<sup>2</sup>/degrees/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1Dth\_nu
- **originalname** : MINERvA\_CCNpip\_XSec\_1Dth\_nu\_2016
- $\chi^2$  : 52.9607
- **NDOF** : 14
- $\chi^2/\text{NDOF}$  : 3.7829



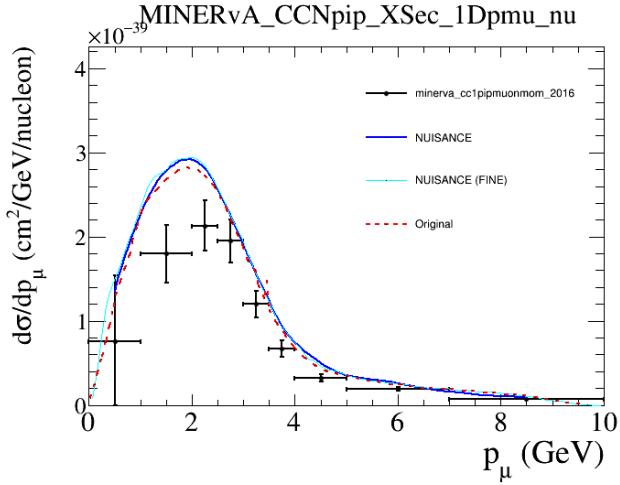
MINERvA\_CCNpip\_XSec\_1DEnu\_nu\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1DEnu\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1DEnu\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuebar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $E_\nu$  (GeV)
- **ytitle** :  $d\sigma(E_\nu)$  (cm<sup>2</sup>/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1DEnu\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCNp
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCN
- **originalname** : MINERvA\_CCNpip\_XSec\_1DEnu\_nu
- $\chi^2$  : 19.1013
- **NDOF** : 8
- $\chi^2/\text{NDOF}$  : 2.38766



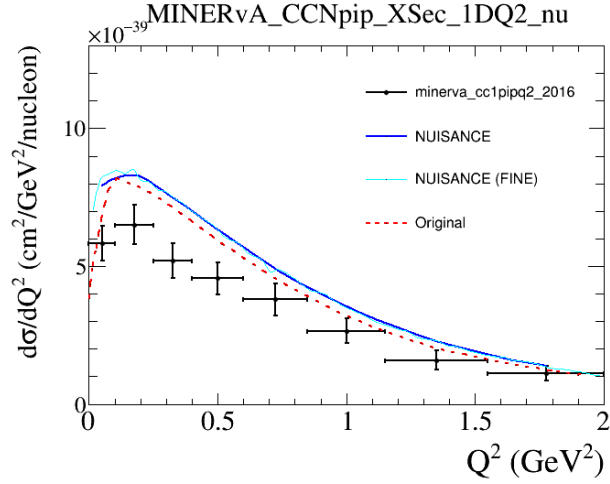
MINERvA\_CCNpip\_XSec\_1DTpi\_nu\_2016\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1DTpi\_nu\_2016
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1DTpi\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuubar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $T_{\pi} \text{ (MeV)}$
- **ytitle** :  $(1/T\Phi) dN_{\pi}/dT_{\pi} \text{ (cm}^2/\text{MeV/nucleon)}$
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1DTpi\_nu
- **originalname** : MINERvA\_CCNpip\_XSec\_1DTpi\_nu\_2016
- $\chi^2$  : 29.5758
- **NDOF** : 7
- $\chi^2/\text{NDOF}$  : 4.22511



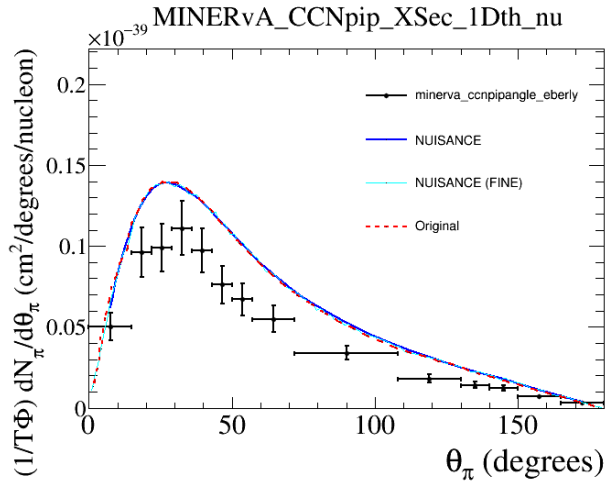
MINERvA\_CCNpip\_XSec\_1Dpmu\_nu\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1Dpmu\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1Dpmu\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuubar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $p_{\mu} \text{ (GeV)}$
- **ytitle** :  $d\sigma/dp_{\mu} \text{ (cm}^2/\text{GeV/nucleon)}$
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1Dpmu\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCNp
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCN
- **originalname** : MINERvA\_CCNpip\_XSec\_1Dpmu\_nu
- $\chi^2$  : 45.0958
- **NDOF** : 9
- $\chi^2/\text{NDOF}$  : 5.01064



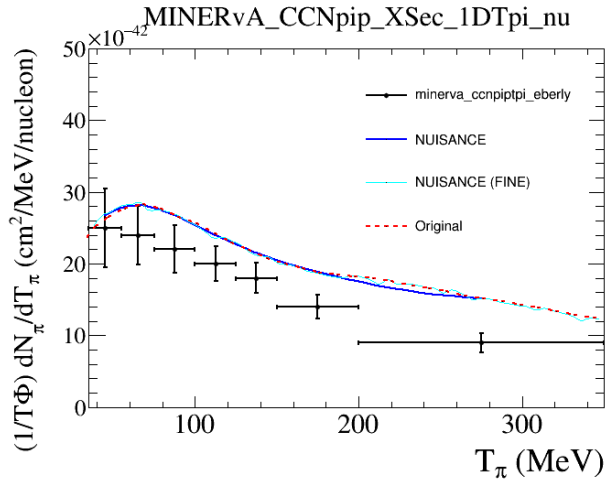
MINERvA\_CCNpip\_XSec\_1DQ2\_nu\_settings

- **name** : MINERvA\_CCNpip\_XSec\_1DQ2\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCNpip\_XSec\_1DQ2\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current nue + nuubar  
 ↳ Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $Q^2 \text{ (GeV}^2\text{)}$
- **ytitle** :  $d\sigma/dQ^2 \text{ (cm}^2/\text{GeV}^2/\text{nucleon)}$
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCNpip\_XSec\_1DQ2\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCNp
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCN
- **originalname** : MINERvA\_CCNpip\_XSec\_1DQ2\_nu
- $\chi^2$  : 19.4362
- **NDOF** : 8
- $\chi^2/\text{NDOF}$  : 2.42953



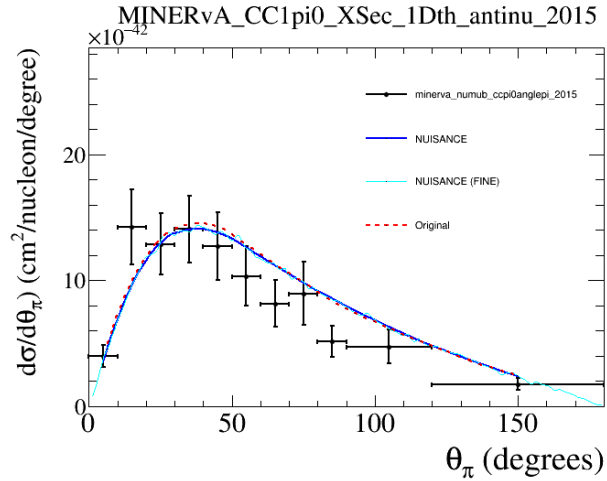
MINERvA\_CCnpip\_XSec\_1Dth\_nu\_settings

- **name** : MINERvA\_CCnpip\_XSec\_1Dth\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳-> MINERvA\_CCnpip\_XSec\_1Dth\_nu sample.  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current nue + nuebar  
 ↳-> Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $\theta_\pi$  (degrees)
- **ytitle** :  $(1/T\Phi) dN_\pi/d\theta_\pi$  (cm²/degrees/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCnpip\_XSec\_1Dth\_nu
- **originalname** : MINERvA\_CCnpip\_XSec\_1Dth\_nu
- $\chi^2$  : 52.9607
- **NDOF** : 14
- $\chi^2/NDOF$  : 3.7829



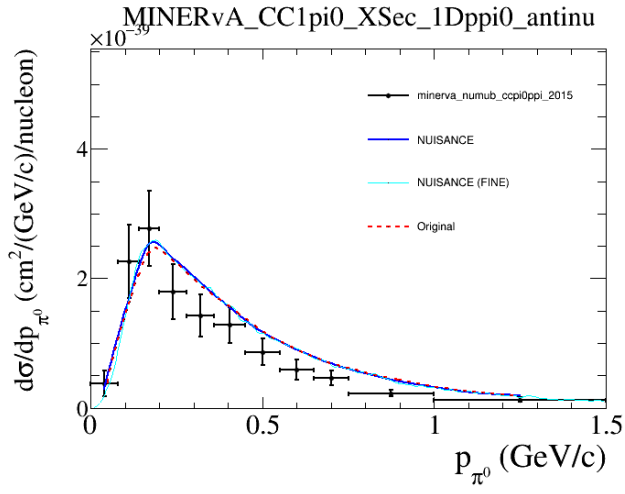
MINERvA\_CCnpip\_XSec\_1DTpi\_nu\_settings

- **name** : MINERvA\_CCnpip\_XSec\_1DTpi\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳-> MINERvA\_CCnpip\_XSec\_1DTpi\_nu sample.  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current nue + nuebar  
 ↳-> Signal: Any event with 1 electron, any nucleons, and no other FS particles
- **xtitle** :  $T_\pi$  (MeV)
- **ytitle** :  $(1/T\Phi) dN_\pi/dT_\pi$  (cm²/MeV/nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CCnpip\_XSec\_1DTpi\_nu
- **originalname** : MINERvA\_CCnpip\_XSec\_1DTpi\_nu
- $\chi^2$  : 29.5758
- **NDOF** : 7
- $\chi^2/NDOF$  : 4.22511



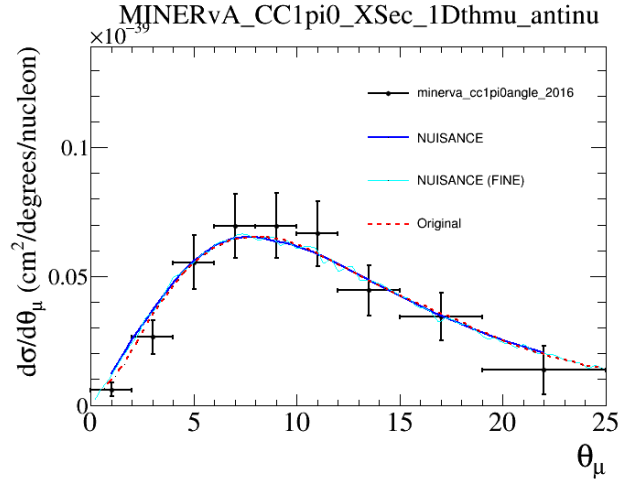
MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2015\_settings

- **name** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2015
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepared
- **type** : DEFAULT
- **description** :  
 ↳-> MINERvA\_CC1pi0\_XSec\_1Dth\_antinu sample.  
 ↳-> Target: CH  
 ↳-> Flux: MINERvA Forward Horn Current numubar  
 ↳-> Signal: Any event with 1 muon, 1 pion, no other tracks
- **xtitle** :  $\theta_\pi$  (degrees)
- **ytitle** :  $d\sigma/d\theta_\pi$  (cm²/nucleon/degree)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu
- **originalname** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2015
- $\chi^2$  : 17.2829
- **NDOF** : 11
- $\chi^2/NDOF$  : 1.57117



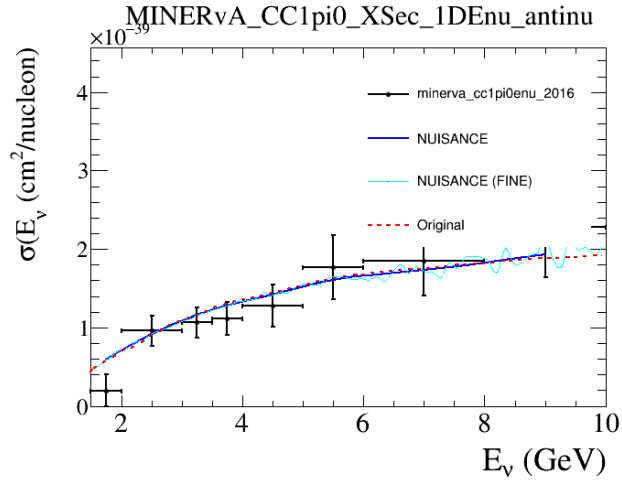
MINERvA\_CC1pi0\_XSec\_1Dppi0\_antinu\_settings

- name** : MINERvA\_CC1pi0\_XSec\_1Dppi0\_antinu
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 l-> MINERvA\_CC1pi0\_XSec\_1Dppi0\_antinu sample.  
 l-> Target: CH  
 l-> Flux: MINERvA Forward Horn Current numubar  
 l-> Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $p_{\pi^0}$  (GeV/c)
- ytitle** :  $d\sigma/dp_{\pi^0}$  (cm<sup>2</sup>/(GeV/c)/nucleon)
- default\_types** : FIX,FREE,SHAPE/DIAG/NORM/MASK
- allowed\_types** : FIX/DIAG
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1Dppi0\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1Dppi0\_antinu
- $\chi^2$  : 41.0959
- NDOF** : 11
- $\chi^2/\text{NDOF}$  : 3.73599



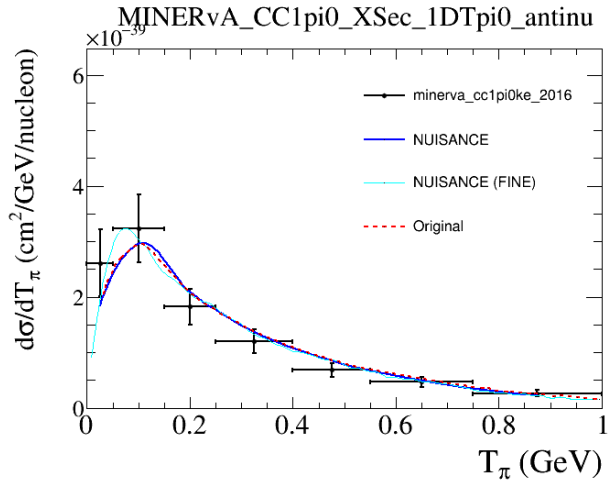
MINERvA\_CC1pi0\_XSec\_1Dthmu\_antinu\_settings

- name** : MINERvA\_CC1pi0\_XSec\_1Dthmu\_antinu
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 l-> MINERvA\_CC1pi0\_XSec\_1Dthmu\_antinu sample.  
 l-> Target: CH  
 l-> Flux: MINERvA Forward Horn Current numubar  
 l-> Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $\theta_{\mu}$
- ytitle** :  $d\sigma/d\theta_{\mu}$  (cm<sup>2</sup>/degrees/nucleon)
- default\_types** : FIX,FREE,SHAPE/DIAG/NORM/MASK
- allowed\_types** : FIX/DIAG
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1Dthmu\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1Dthmu\_antinu
- $\chi^2$  : 10.5358
- NDOF** : 9
- $\chi^2/\text{NDOF}$  : 1.17064



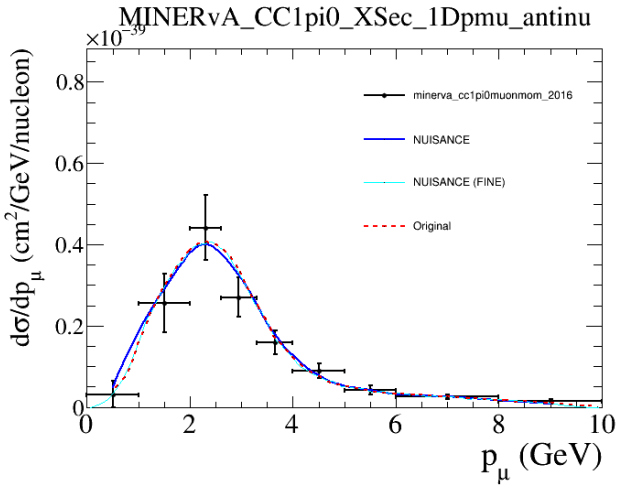
MINERvA\_CC1pi0\_XSec\_1DEnu\_antinu\_settings

- name** : MINERvA\_CC1pi0\_XSec\_1DEnu\_antinu
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 l-> MINERvA\_CC1pi0\_XSec\_1DEnu\_antinu sample.  
 l-> Target: CH  
 l-> Flux: MINERvA Forward Horn Current numubar  
 l-> Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $E_{\nu}$  (GeV)
- ytitle** :  $\sigma(E_{\nu})$  (cm<sup>2</sup>/nucleon)
- default\_types** : FIX,FREE,SHAPE/DIAG/NORM/MASK
- allowed\_types** : FIX/DIAG
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1DEnu\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1DEnu\_antinu
- $\chi^2$  : 6.15226
- NDOF** : 8
- $\chi^2/\text{NDOF}$  : 0.769033



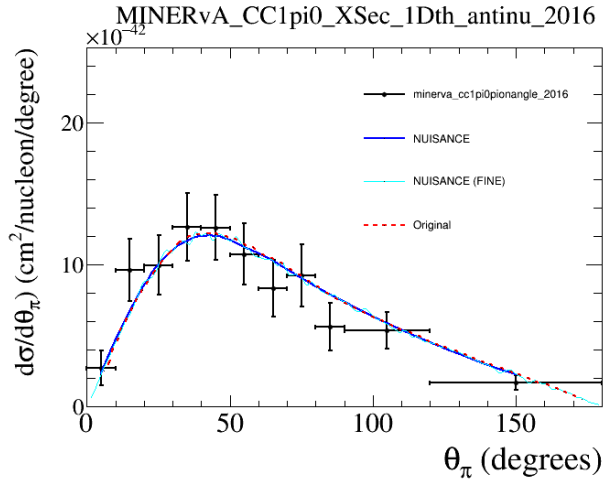
MINERvA\_CC1pi0\_XSec\_1DTpi0\_antinu\_settings

- name** : MINERvA\_CC1pi0\_XSec\_1DTpi0\_antinu
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 ↳ MINERvA\_CC1pi0\_XSec\_1DTpi0\_antinu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numubar  
 ↳ Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $T_\pi$  (GeV)
- ytitle** :  $d\sigma/dT_\pi$  (cm<sup>2</sup>/GeV/nucleon)
- default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- allowed\_types** : FIX/FULL
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1DTpi0\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1DTpi0\_antinu
- $\chi^2$  : 10.5678
- NDOF** : 7
- $\chi^2/\text{NDOF}$  : 1.50969



MINERvA\_CC1pi0\_XSec\_1Dpmu\_antinu\_settings

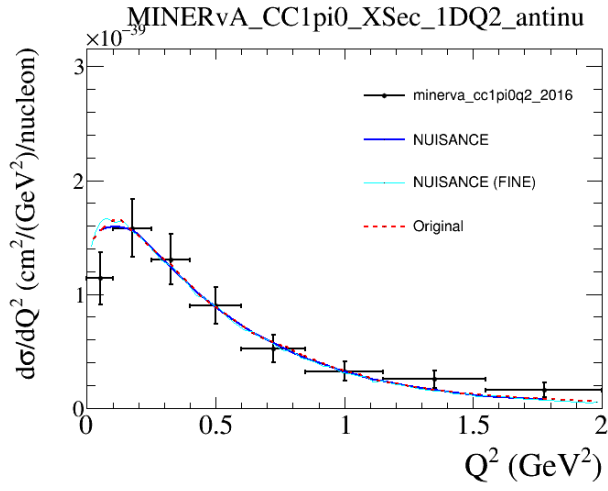
- name** : MINERvA\_CC1pi0\_XSec\_1Dpmu\_antinu
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 ↳ MINERvA\_CC1pi0\_XSec\_1Dpmu\_antinu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numubar  
 ↳ Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $p_\mu$  (GeV)
- ytitle** :  $d\sigma/dp_\mu$  (cm<sup>2</sup>/GeV/nucleon)
- default\_types** : FIX,FREE,SHAPE/DIAG/NORM/MASK
- allowed\_types** : FIX/DIAG
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1Dpmu\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1Dpmu\_antinu
- $\chi^2$  : 7.07499
- NDOF** : 9
- $\chi^2/\text{NDOF}$  : 0.78611



MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2016\_settings

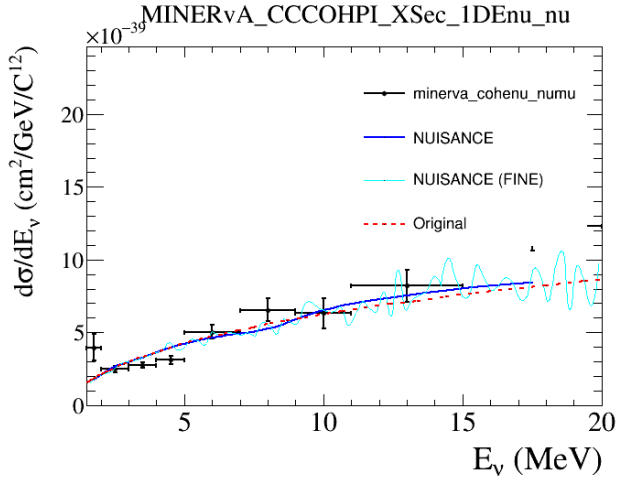
- name** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2016
- input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type** : DEFAULT
- description** :  
 ↳ MINERvA\_CC1pi0\_XSec\_1Dth\_antinu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numubar  
 ↳ Signal: Any event with 1 muon, 1 pion, no other tracks
- xtitle** :  $\theta_\pi$  (degrees)
- ytitle** :  $d\sigma/d\theta_\pi$  (cm<sup>2</sup>/nucleon/degree)
- default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- allowed\_types** : FIX/FULL
- enu\_min** : 1.5
- enu\_max** : 10
- title** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu
- originalname** : MINERvA\_CC1pi0\_XSec\_1Dth\_antinu\_2016
- $\chi^2$  : 7.75216
- NDOF** : 11
- $\chi^2/\text{NDOF}$  : 0.704742





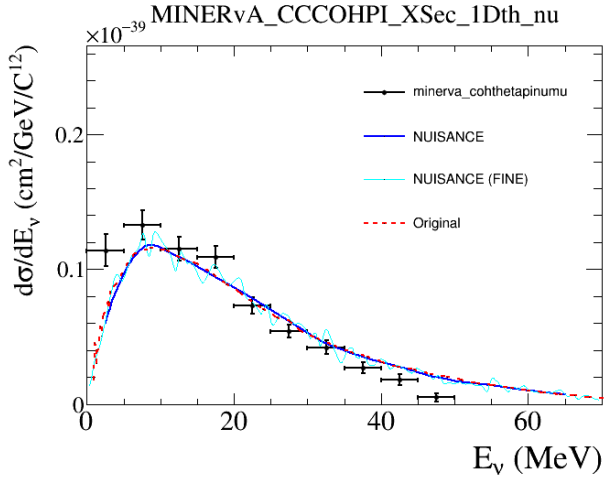
MINERvA\_CC1pi0\_XSec\_1DQ2\_antinu\_settings

- **name** : MINERvA\_CC1pi0\_XSec\_1DQ2\_antinu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CC1pi0\_XSec\_1DQ2\_antinu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numubar  
 ↳ Signal: Any event with 1 muon, 1 pion, no other tracks
- **xtitle** :  $Q^2$  (GeV<sup>2</sup>)
- **ytitle** :  $d\sigma/dQ^2$  (cm<sup>2</sup>/(GeV<sup>2</sup>)nucleon)
- **default\_types** : FIX,FREE,SHAPE/DIAG/NORM/MASK
- **allowed\_types** : FIX/DIAG
- **enu\_min** : 1.5
- **enu\_max** : 10
- **title** : MINERvA\_CC1pi0\_XSec\_1DQ2\_antinu
- **originalname** : MINERvA\_CC1pi0\_XSec\_1DQ2\_antinu
- $\chi^2$  : 10.4201
- **NDOF** : 8
- $\chi^2/\text{NDOF}$  : 1.30251



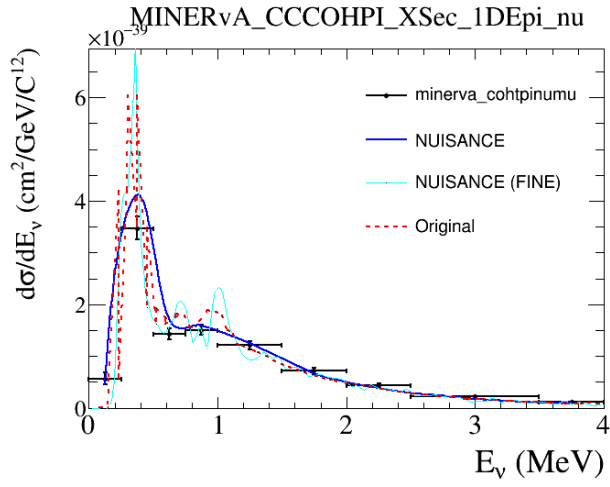
MINERvA\_CCCOHPI\_XSec\_1DEnu\_nu\_settings

- **name** : MINERvA\_CCCOHPI\_XSec\_1DEnu\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCCOHPI\_XSec\_1DEnu\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numu  
 ↳ Signal: Any event with 1 mu-, 1 pi+, and no other FS particles
- **xtitle** :  $E_\nu$  (MeV)
- **ytitle** :  $d\sigma/dE_\nu$  (cm<sup>2</sup>/GeV/C<sup>12</sup>)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 20
- **title** : MINERvA\_CCCOHPI\_XSec\_1DEnu\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
- **originalname** : MINERvA\_CCCOHPI\_XSec\_1DEnu\_nu
- $\chi^2$  : 0
- **NDOF** : 9
- $\chi^2/\text{NDOF}$  : 0



MINERvA\_CCCOHPI\_XSec\_1Dth\_nu\_settings

- **name** : MINERvA\_CCCOHPI\_XSec\_1Dth\_nu
- **input** : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_fhc\_numu.CH.2500000.1.prepared
- **type** : DEFAULT
- **description** :  
 ↳ MINERvA\_CCCOHPI\_XSec\_1Dth\_nu sample.  
 ↳ Target: CH  
 ↳ Flux: MINERvA Forward Horn Current numu  
 ↳ Signal: Any event with 1 mu-, 1 pi+, and no other FS particles
- **xtitle** :  $E_\nu$  (MeV)
- **ytitle** :  $d\sigma/dE_\nu$  (cm<sup>2</sup>/GeV/C<sup>12</sup>)
- **default\_types** : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- **allowed\_types** : FIX/FULL
- **enu\_min** : 1.5
- **enu\_max** : 20
- **title** : MINERvA\_CCCOHPI\_XSec\_1Dth\_nu
- **data** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
- **covar** : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
- **originalname** : MINERvA\_CCCOHPI\_XSec\_1Dth\_nu
- $\chi^2$  : 0
- **NDOF** : 12
- $\chi^2/\text{NDOF}$  : 0

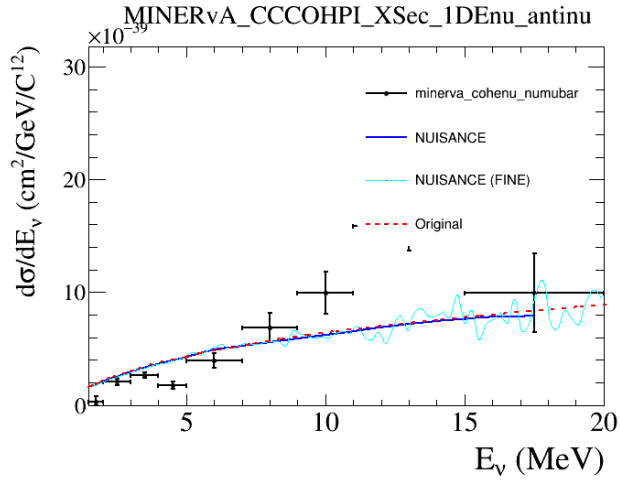


MINERvA\_CCCOHPI\_XSec\_1DEpi\_nu\_settings

```

• name : MINERvA_CCCOHPI_XSec_1DEpi_nu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_rhc_numu.CH.2500000.1.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CCCOHPI_XSec_1DEpi_nu sample.
  |--> Target: CH
  |--> Flux: MINERvA Forward Horn Current numu
  |--> Signal: Any event with 1 mu-, 1 pi-, and no other FS particles
• xtitle : Eν (MeV)
• ytitle : dσ/dEν (cm²/GeV/C¹²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 20
• title : MINERvA_CCCOHPI_XSec_1DEpi_nu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
• originalname : MINERvA_CCCOHPI_XSec_1DEpi_nu
• χ² : 0
• NDOF : 9
• χ²/NDOF : 0

```

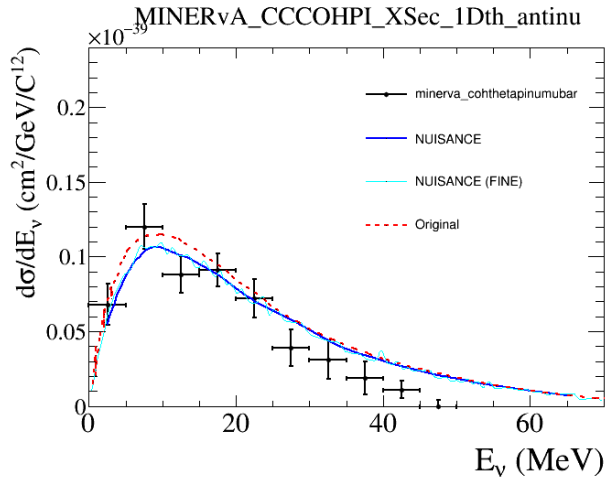


MINERvA\_CCCOHPI\_XSec\_1Denu\_antinu\_settings

```

• name : MINERvA_CCCOHPI_XSec_1Denu_antinu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_rhc_numubar.CH.2500000.2.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CCCOHPI_XSec_1Denu_antinu sample.
  |--> Target: CH
  |--> Flux: MINERvA Reverse Horn Current numu
  |--> Signal: Any event with 1 mu+, 1 pi-, and no other FS particles
• xtitle : Eν (MeV)
• ytitle : dσ/dEν (cm²/GeV/C¹²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 20
• title : MINERvA_CCCOHPI_XSec_1Denu_antinu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
• originalname : MINERvA_CCCOHPI_XSec_1Denu_antinu
• χ² : 0
• NDOF : 9
• χ²/NDOF : 0

```

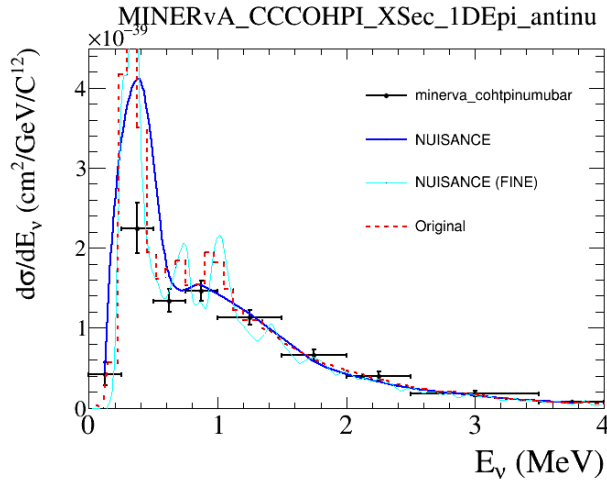


MINERvA\_CCCOHPI\_XSec\_1Dth\_antinu\_settings

```

• name : MINERvA_CCCOHPI_XSec_1Dth_antinu
• input : GENIE:@GENIE_DIR/gntp.R-2_6_3.OfficialDefault.Default.MINERvA_rhc_numubar.CH.2500000.2.prepared
• type : DEFAULT
• description :
  |--> MINERvA_CCCOHPI_XSec_1Dth_antinu sample.
  |--> Target: CH
  |--> Flux: MINERvA Reverse Horn Current numu
  |--> Signal: Any event with 1 mu+, 1 pi-, and no other FS particles
• xtitle : Eν (MeV)
• ytitle : dσ/dEν (cm²/GeV/C¹²)
• default_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
• allowed_types : FIX/FULL
• enu_min : 1.5
• enu_max : 20
• title : MINERvA_CCCOHPI_XSec_1Dth_antinu
• data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
• covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
• originalname : MINERvA_CCCOHPI_XSec_1Dth_antinu
• χ² : 0
• NDOF : 12
• χ²/NDOF : 0

```



MINERvA\_CCCOHPI\_XSec\_1DEpi\_antinu\_settings

- name : MINERvA\_CCCOHPI\_XSec\_1DEpi\_antinu
- input : GENIE:@GENIE\_DIR/gntp.R-2\_6\_3.OfficialDefault.Default.MINERvA\_rhc\_numubar.CH.2500000.2.prepa
- type : DEFAULT
- description :  
 |--> MINERvA\_CCCOHPI\_XSec\_1DEpi\_antinu sample.  
 |--> Target: CH  
 |--> Flux: MINERvA Reverse Horn Current numu  
 |--> Signal: Any event with 1 mu+, 1 pi-, and no other FS particles
- xtitle :  $E_\nu$  (MeV)
- ytitle :  $d\sigma/dE_\nu$  ( $\text{cm}^2/\text{GeV}/\text{C}^{12}$ )
- default\_types : FIX,FREE,SHAPE/DIAG,FULL/NORM/MASK
- allowed\_types : FIX/FULL
- enu\_min : 1.5
- enu\_max : 20
- title : MINERvA\_CCCOHPI\_XSec\_1DEpi\_antinu
- data : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCcoh
- covar : /data/stowell/NIWG/NPCTuning/Validations/minerva-validation-template/builds/v2r6/data/MINERvA/CCco
- originalname : MINERvA\_CCCOHPI\_XSec\_1DEpi\_antinu
- $\chi^2$  : 0
- NDOF : 9
- $\chi^2/\text{NDOF}$  : 0

