

# MC-TESTER results for decays of particle $\tau^-$ (PDG code 15).

Nadia Davidson      Piotr Golonka      Tomasz Pierzchala  
Tomasz Przedzinski      Zbigniew Was

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## Results from **generator 1**.

Tau decays from TAUOLA CLEO  
benchmark file taken from MC-TESTER web page  
sample of 1Mevt is for fast test

- From directory:
  
- Total number of analyzed decays: 1000000
- Number of decay channels found: 18 + 12

## Results from **generator 2**.

tau decays from evtgen (some minor modes from pythia)  
prepared by P. Robbe and Z. Was during MC4LHC readiness workshop  
March 29 - April 1 2010

- From directory:
  
- Total number of analyzed decays: 1000000
- Number of decay channels found: 18 + 15

## Found decay modes:

Decay channel	Branching Ratio $\pm$ Rough Errors		Max. shape dif. param.
	Generator #1	Generator #2	
$\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$	25.3142 $\pm$ 0.0503%	25.4289 $\pm$ 0.0504%	0.02345
$\tau^- \rightarrow \nu_\tau \widetilde{\nu}_e e^-$	18.1628 $\pm$ 0.0426%	17.7982 $\pm$ 0.0422%	0.00000
$\tau^- \rightarrow \nu_\tau \widetilde{\nu}_\mu \mu^-$	17.6346 $\pm$ 0.0420%	17.3382 $\pm$ 0.0416%	0.00000
$\tau^- \rightarrow \pi^- \nu_\tau$	11.1480 $\pm$ 0.0334%	10.8579 $\pm$ 0.0330%	0.00000
$\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$	9.0735 $\pm$ 0.0301%	9.1823 $\pm$ 0.0303%	0.11613
$\tau^- \rightarrow \pi^- \pi^- \pi^+ \nu_\tau$	8.8744 $\pm$ 0.0298%	9.2322 $\pm$ 0.0304%	0.11593
$\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \nu_\tau$	4.5184 $\pm$ 0.0213%	4.5516 $\pm$ 0.0213%	0.43750
$\tau^- \rightarrow \pi^- \pi^0 \pi^0 \pi^0 \nu_\tau$	0.9995 $\pm$ 0.0100%	1.0000 $\pm$ 0.0100%	0.24660
$\tau^- \rightarrow K^- \nu_\tau$	0.7184 $\pm$ 0.0085%	0.6821 $\pm$ 0.0083%	0.00000
$\tau^- \rightarrow K^- \pi^- \pi^+ \nu_\tau$	0.5118 $\pm$ 0.0072%	0.3233 $\pm$ 0.0057%	0.75441
$\tau^- \rightarrow \eta \pi^- \pi^0 \nu_\tau$	0.1694 $\pm$ 0.0041%	0.1593 $\pm$ 0.0040%	0.69879
$\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$	0.1589 $\pm$ 0.0040%	0.1445 $\pm$ 0.0038%	0.58929
$\tau^- \rightarrow \pi^- \pi^0 \gamma \nu_\tau$	0.1334 $\pm$ 0.0037%	0.1279 $\pm$ 0.0036%	1.23185
$\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \pi^0 \nu_\tau$	0.0877 $\pm$ 0.0030%	0.0549 $\pm$ 0.0023%	1.03271
$\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \pi^0 \pi^0 \nu_\tau$	0.0501 $\pm$ 0.0022%	0.0196 $\pm$ 0.0014%	0.02923
$\tau^- \rightarrow K^- \pi^0 \pi^0 \nu_\tau$	0.0498 $\pm$ 0.0022%	0.0440 $\pm$ 0.0021%	0.27543
$\tau^- \rightarrow \pi^- \pi^- \pi^- \pi^+ \pi^+ \nu_\tau$	0.0402 $\pm$ 0.0020%	0.0780 $\pm$ 0.0028%	0.01959
$\tau^- \rightarrow \pi^- \pi^- \pi^- \pi^+ \pi^+ \pi^0 \nu_\tau$	0.0303 $\pm$ 0.0017%	0.0166 $\pm$ 0.0013%	0.00000
Channels From First Generator Only:			
$\tau^- \rightarrow K_S^0 \pi^- \nu_\tau$	0.4574 $\pm$ 0.0068 %	-	-
$\tau^- \rightarrow K^- \pi^0 \nu_\tau$	0.4570 $\pm$ 0.0068 %	-	-
$\tau^- \rightarrow \pi^- K_L^0 \nu_\tau$	0.4465 $\pm$ 0.0067 %	-	-
$\tau^- \rightarrow \pi^- K_L^0 \pi^0 \nu_\tau$	0.2788 $\pm$ 0.0053 %	-	-
$\tau^- \rightarrow K_S^0 \pi^- \pi^0 \nu_\tau$	0.2764 $\pm$ 0.0053 %	-	-
$\tau^- \rightarrow K_S^0 \pi^- K_L^0 \nu_\tau$	0.0810 $\pm$ 0.0028 %	-	-
$\tau^- \rightarrow K^- K_L^0 \pi^0 \nu_\tau$	0.0766 $\pm$ 0.0028 %	-	-
$\tau^- \rightarrow K^- K_S^0 \pi^0 \nu_\tau$	0.0760 $\pm$ 0.0028 %	-	-
$\tau^- \rightarrow K^- K_S^0 \nu_\tau$	0.0542 $\pm$ 0.0023 %	-	-
$\tau^- \rightarrow K^- K_L^0 \nu_\tau$	0.0472 $\pm$ 0.0022 %	-	-
$\tau^- \rightarrow K_S^0 K_S^0 \pi^- \nu_\tau$	0.0388 $\pm$ 0.0020 %	-	-
$\tau^- \rightarrow \pi^- K_L^0 K_L^0 \nu_\tau$	0.0347 $\pm$ 0.0019 %	-	-
Channels From Second Generator Only:			
$\tau^- \rightarrow K^{*-} \nu_\tau$	-	1.1634 $\pm$ 0.01079 %	-
$\tau^- \rightarrow \omega \pi^- \pi^0 \nu_\tau$	-	0.3612 $\pm$ 0.00601 %	-

$\tau^- \rightarrow \widetilde{K^0} \pi^- \pi^0 \nu_\tau$	-	$0.3512 \pm 0.00593 \%$	-
$\tau^- \rightarrow K^{*0} \pi^- \nu_\tau$	-	$0.1782 \pm 0.00422 \%$	-
$\tau^- \rightarrow K^- K^{*0} \nu_\tau$	-	$0.1744 \pm 0.00418 \%$	-
$\tau^- \rightarrow K^- K^0 \nu_\tau$	-	$0.1510 \pm 0.00389 \%$	-
$\tau^- \rightarrow K^- K^0 \pi^0 \nu_\tau$	-	$0.1413 \pm 0.00376 \%$	-
$\tau^- \rightarrow K^0 K^0 \pi^- \nu_\tau$	-	$0.1375 \pm 0.00371 \%$	-
$\tau^- \rightarrow K^- \pi^- \pi^+ \pi^0 \nu_\tau$	-	$0.1248 \pm 0.00353 \%$	-
$\tau^- \rightarrow \pi^- \pi^0 \pi^0 \pi^0 \nu_\tau$	-	$0.1030 \pm 0.00321 \%$	-
$\tau^- \rightarrow K^0 \pi^- \nu_\tau$	-	$0.0385 \pm 0.00196 \%$	-
$\tau^- \rightarrow K^- \omega \nu_\tau$	-	$0.0282 \pm 0.00168 \%$	-
$\tau^- \rightarrow \phi K^- \nu_\tau$	-	$0.0034 \pm 0.00058 \%$	-
$\tau^- \rightarrow \phi \pi^- \nu_\tau$	-	$0.0030 \pm 0.00055 \%$	-
$\tau^- \rightarrow K^- K^- K^+ \nu_\tau$	-	$0.0014 \pm 0.00037 \%$	-

Similarity coefficients: T1=4.810637 %, T2=4.974267 %

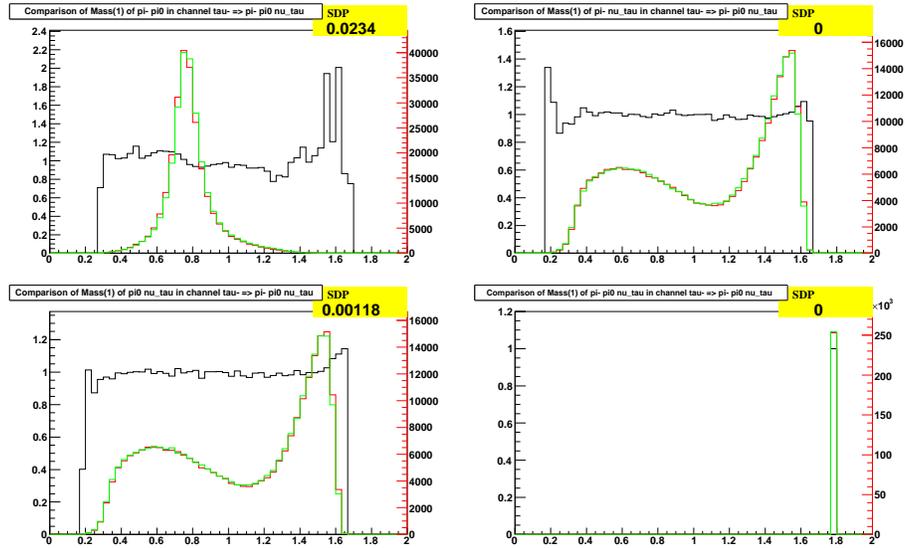
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# 1 Decay Channel: $\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$

Number of events from generator 1: 253142

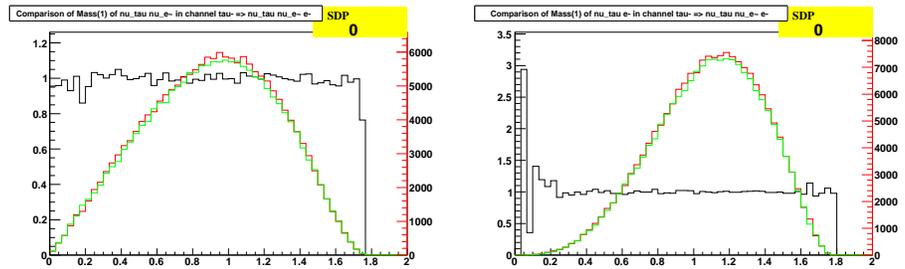
Number of events from generator 2: 254289

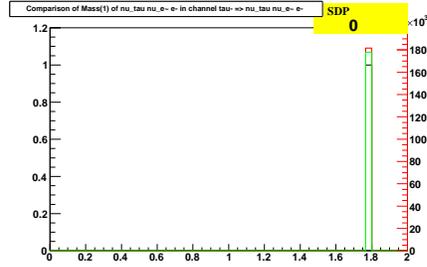
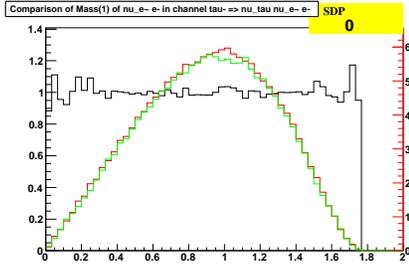


# 2 Decay Channel: $\tau^- \rightarrow \nu_\tau \tilde{\nu}_e e^-$

Number of events from generator 1: 181628

Number of events from generator 2: 177982

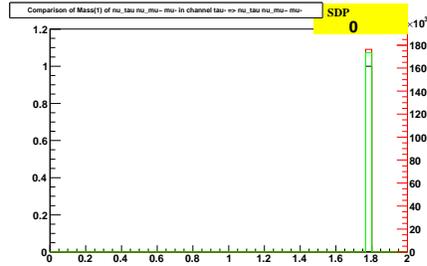
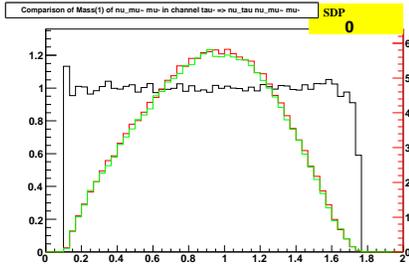
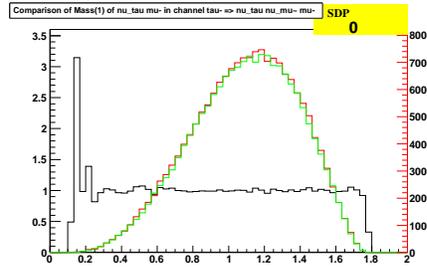
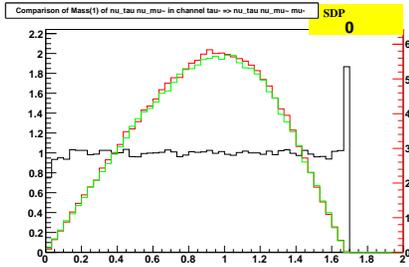




### 3 Decay Channel: $\tau^- \rightarrow \nu_\tau \tilde{\nu}_\mu \mu^-$

Number of events from generator 1: 176346

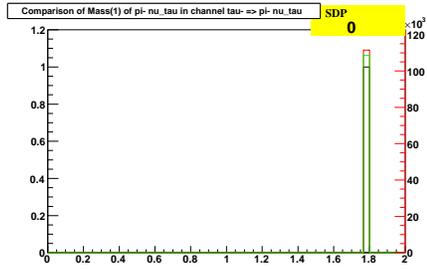
Number of events from generator 2: 173382



### 4 Decay Channel: $\tau^- \rightarrow \pi^- \nu_\tau$

Number of events from generator 1: 111480

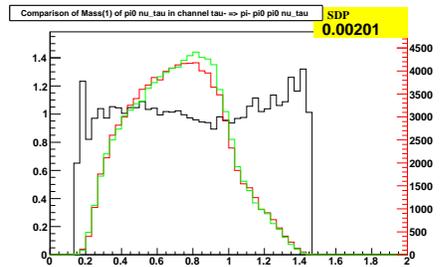
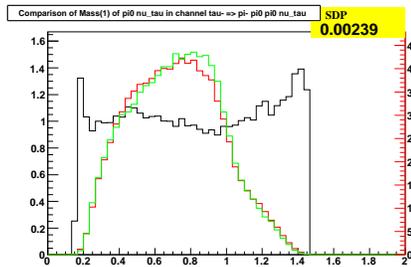
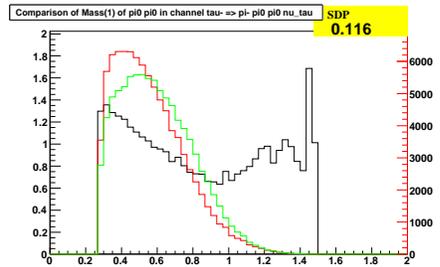
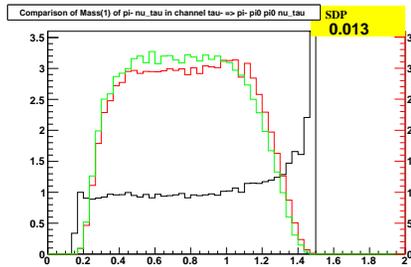
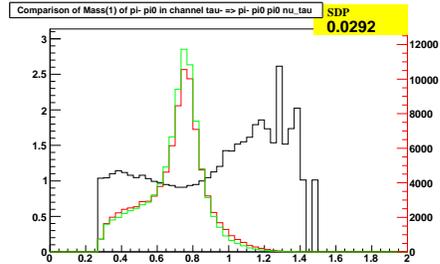
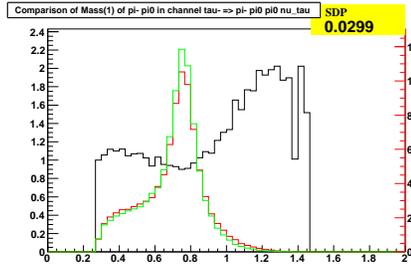
Number of events from generator 2: 108579

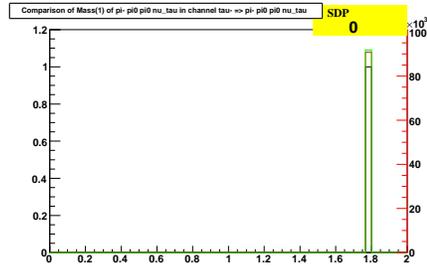
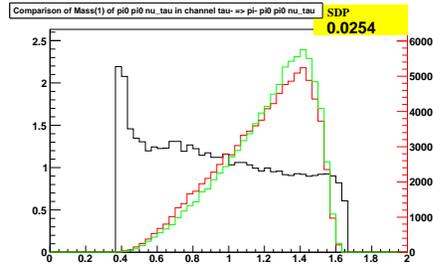
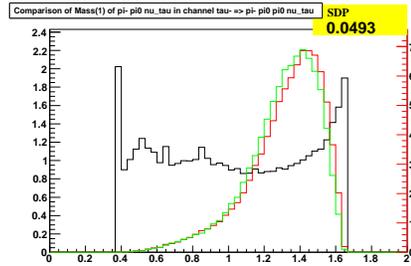
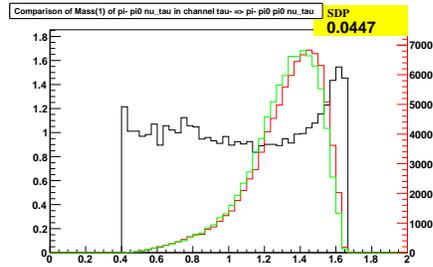
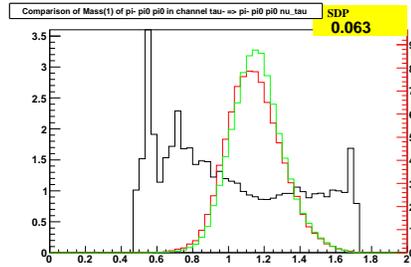


## 5 Decay Channel: $\tau^- \rightarrow \pi^- \pi^0 \pi^0 \nu_\tau$

Number of events from generator 1: 90735

Number of events from generator 2: 91823

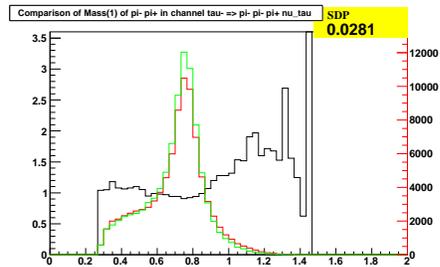
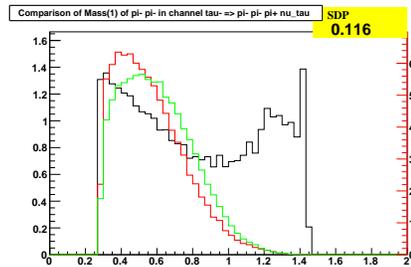


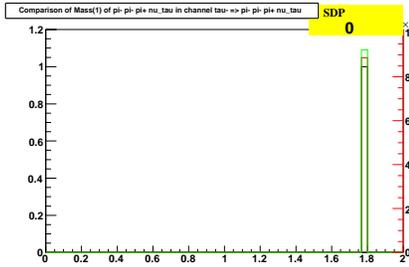
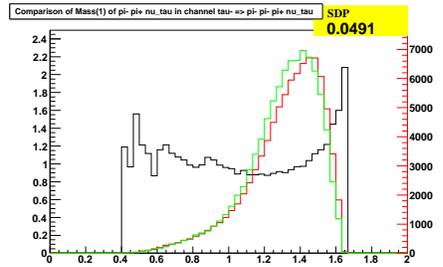
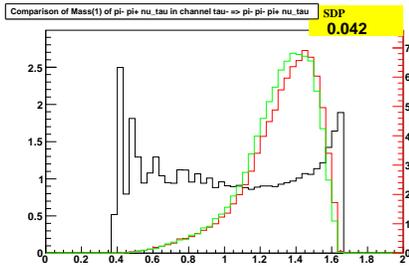
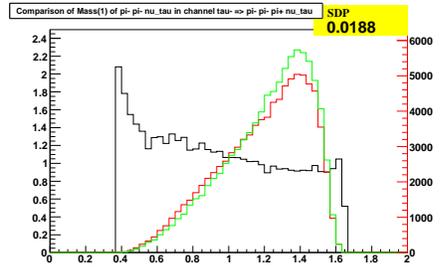
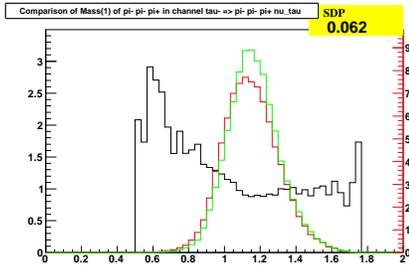
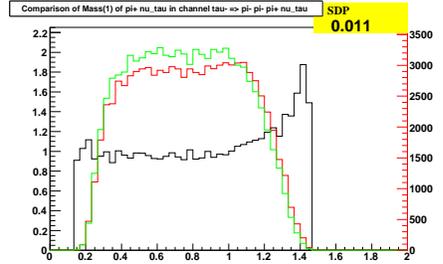
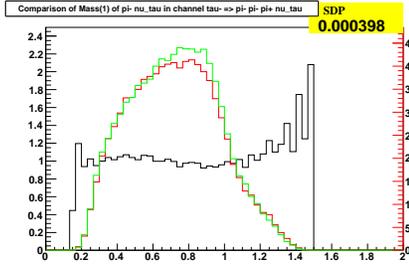
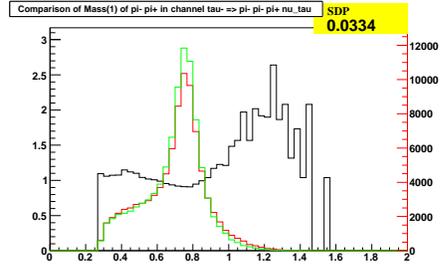
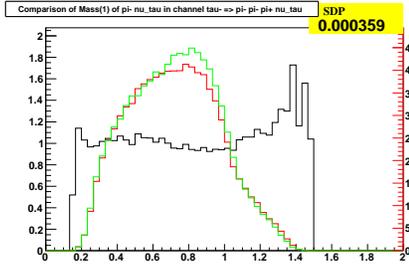


## 6 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^+ \nu_\tau$

Number of events from generator 1: 88744

Number of events from generator 2: 92322

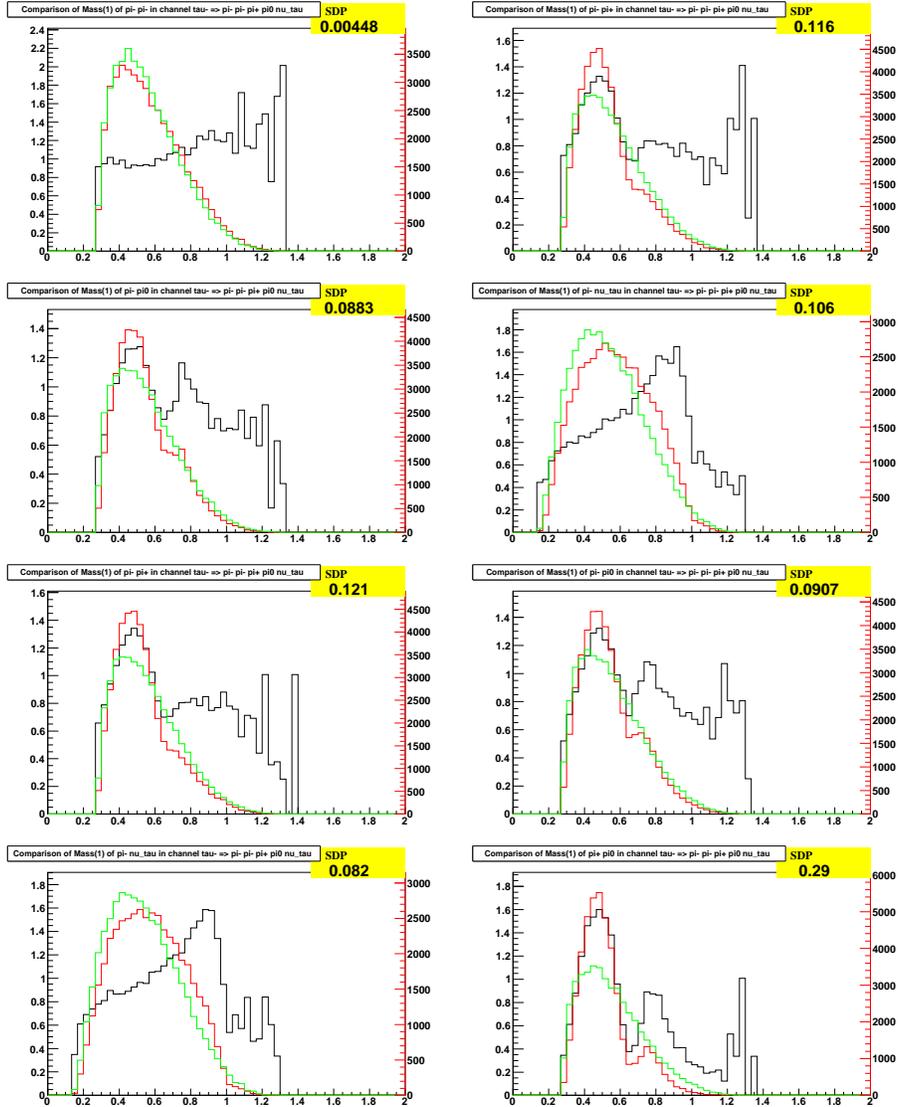


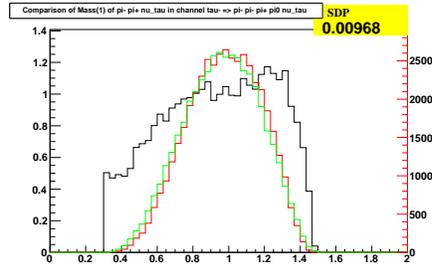
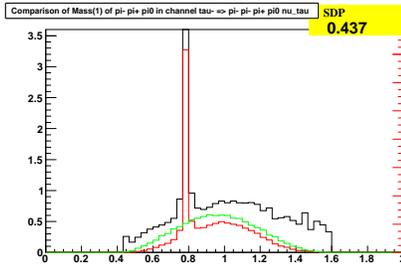
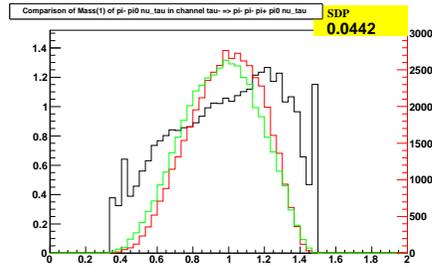
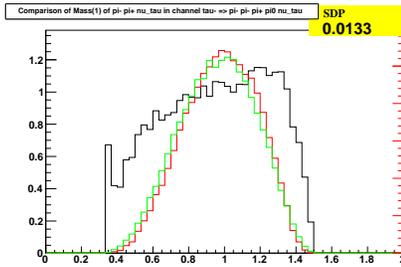
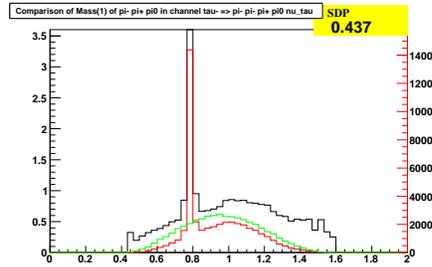
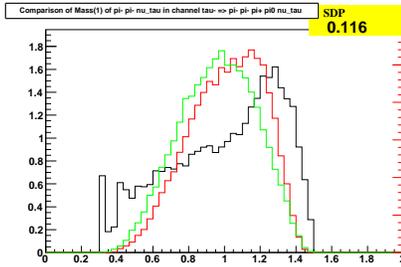
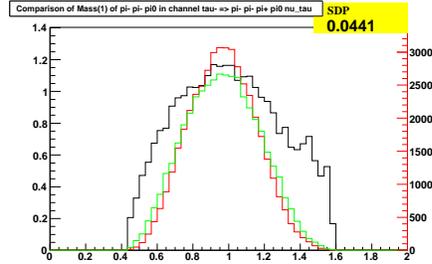
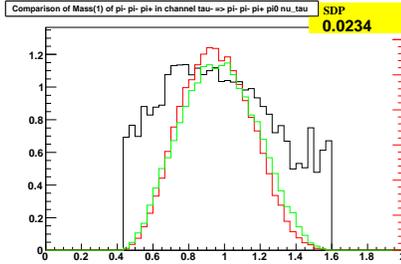
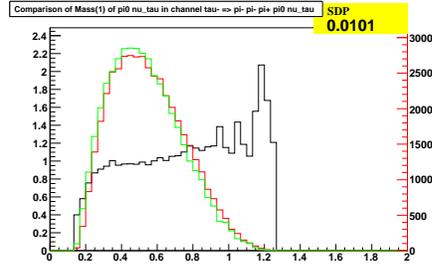
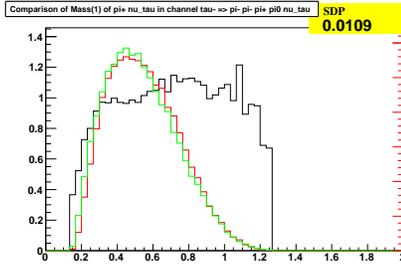


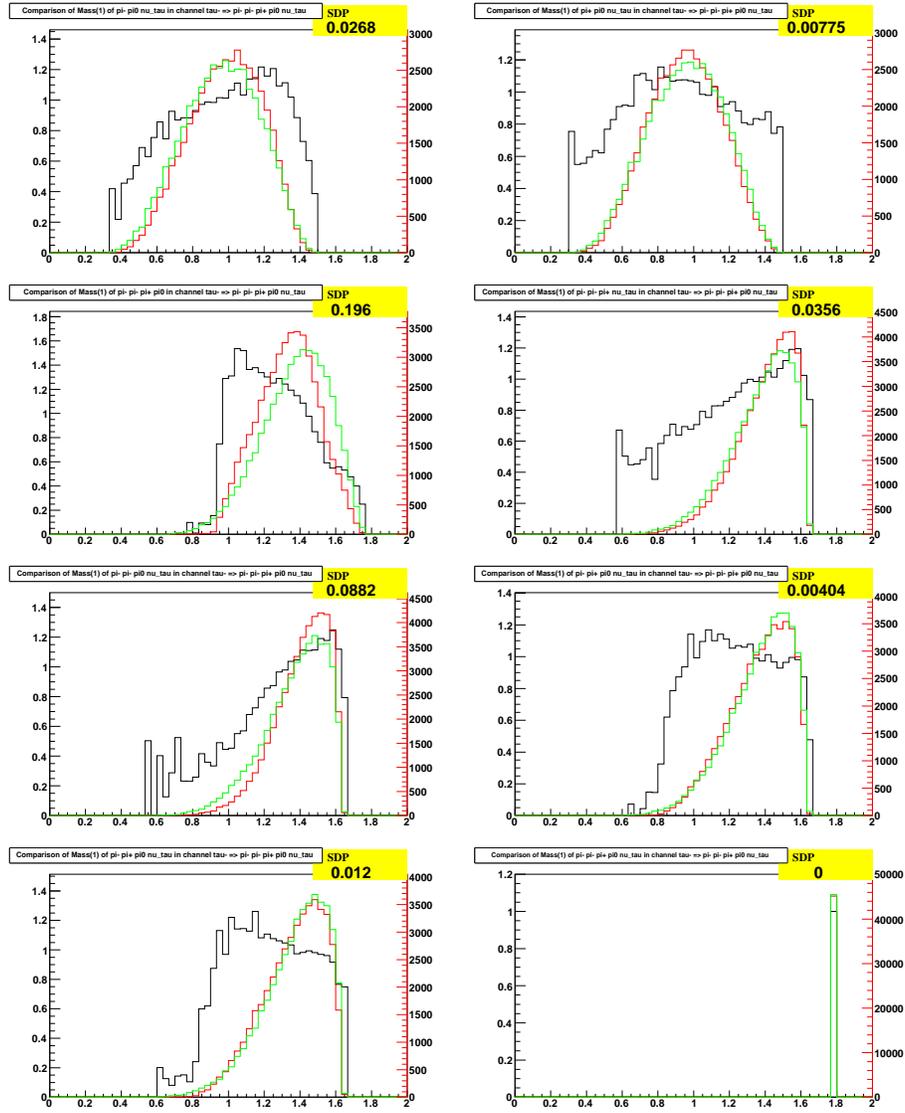
## 7 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \nu_\tau$

Number of events from generator 1: 45184

Number of events from generator 2: 45516



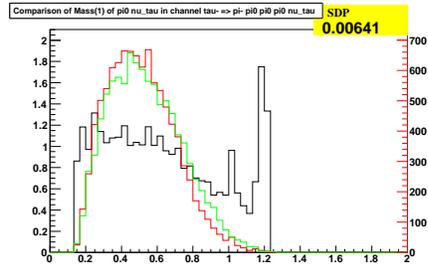
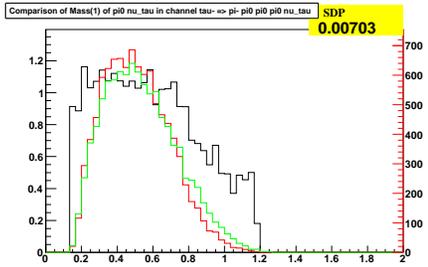
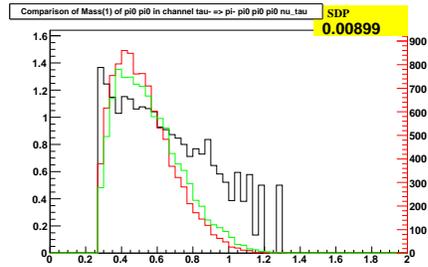
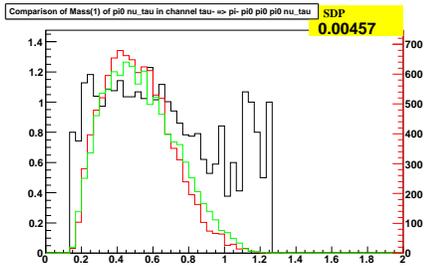
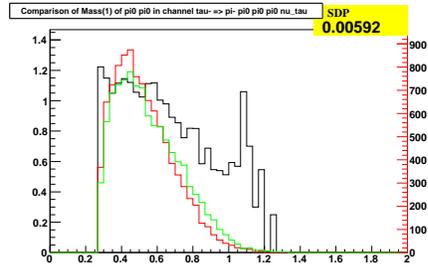
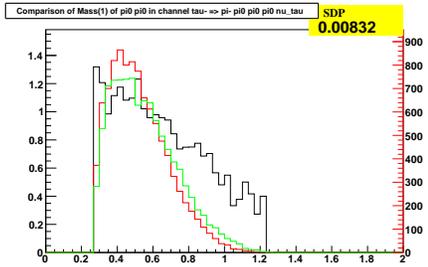
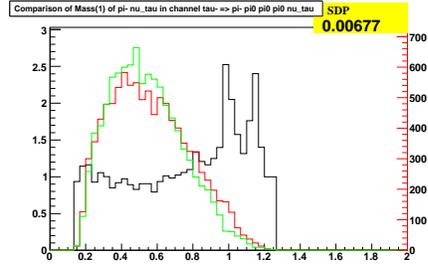
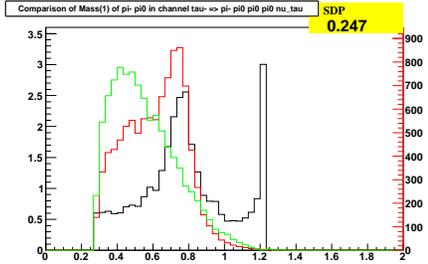
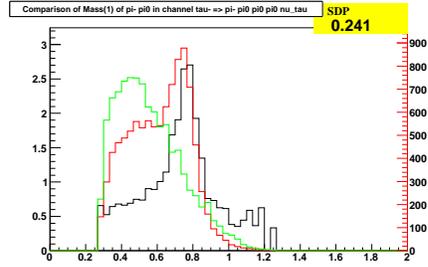
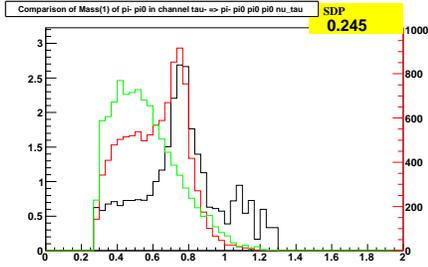


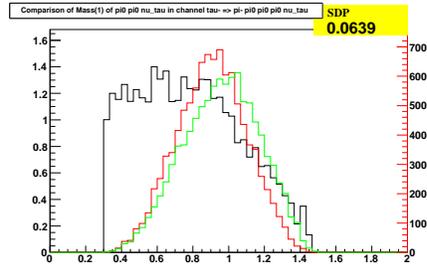
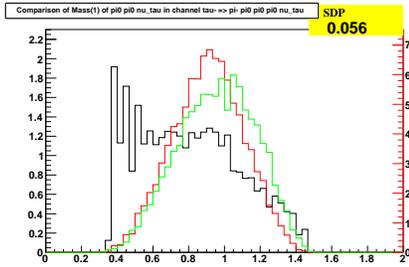
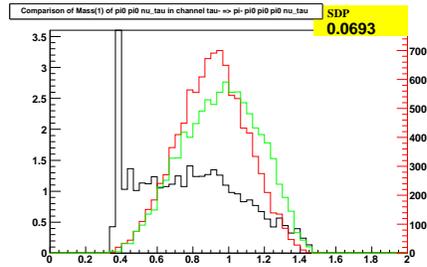
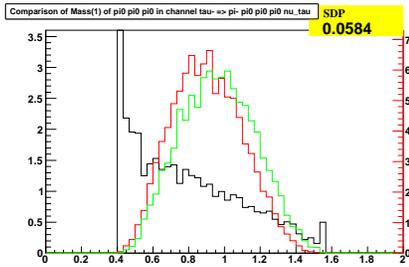
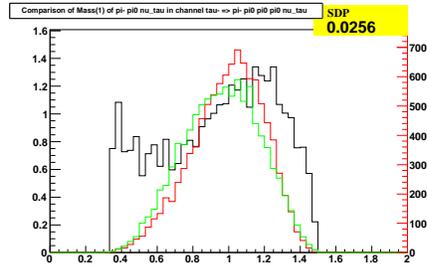
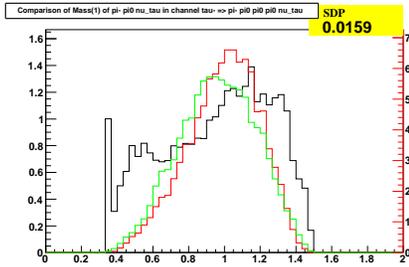
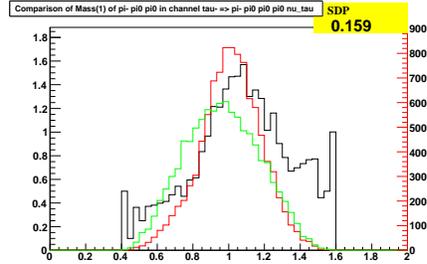
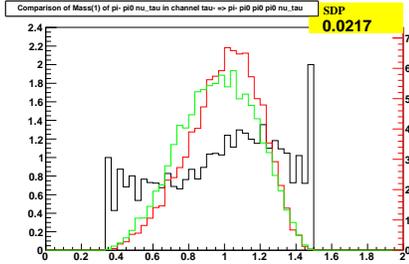
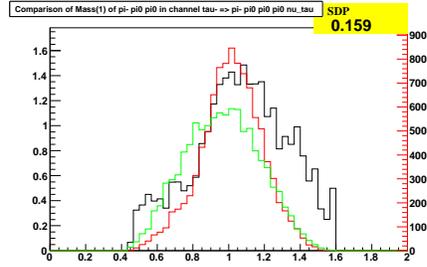
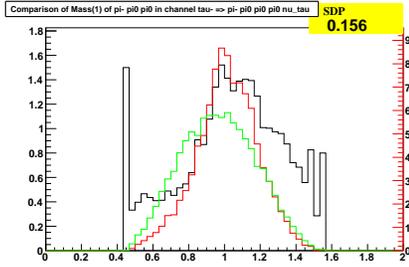


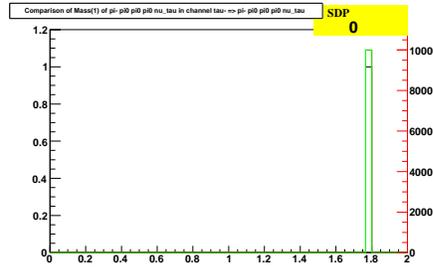
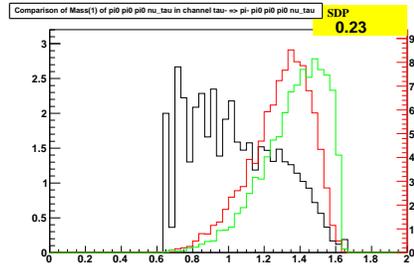
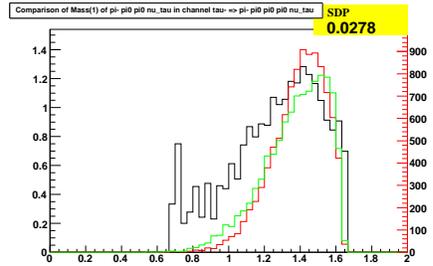
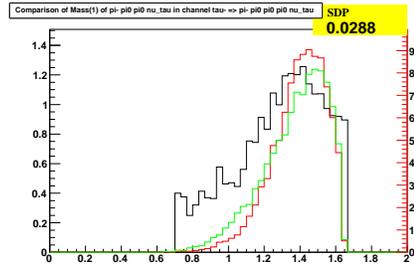
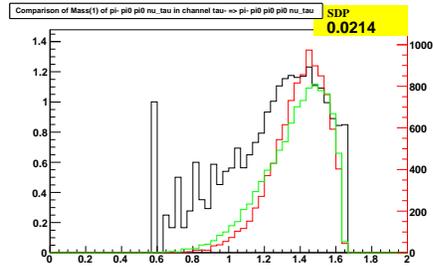
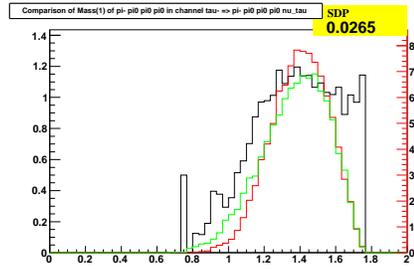
## 8 Decay Channel: $\tau^- \rightarrow \pi^-\pi^0\pi^0\pi^0\nu_\tau$

Number of events from generator 1: 9995

Number of events from generator 2: 10000



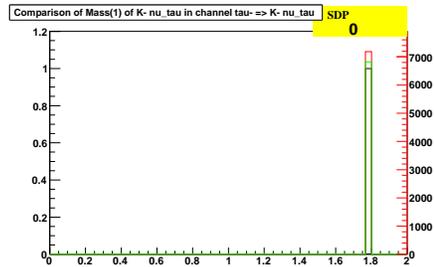




## 9 Decay Channel: $\tau^- \rightarrow K^- \nu_\tau$

Number of events from generator 1: 7184

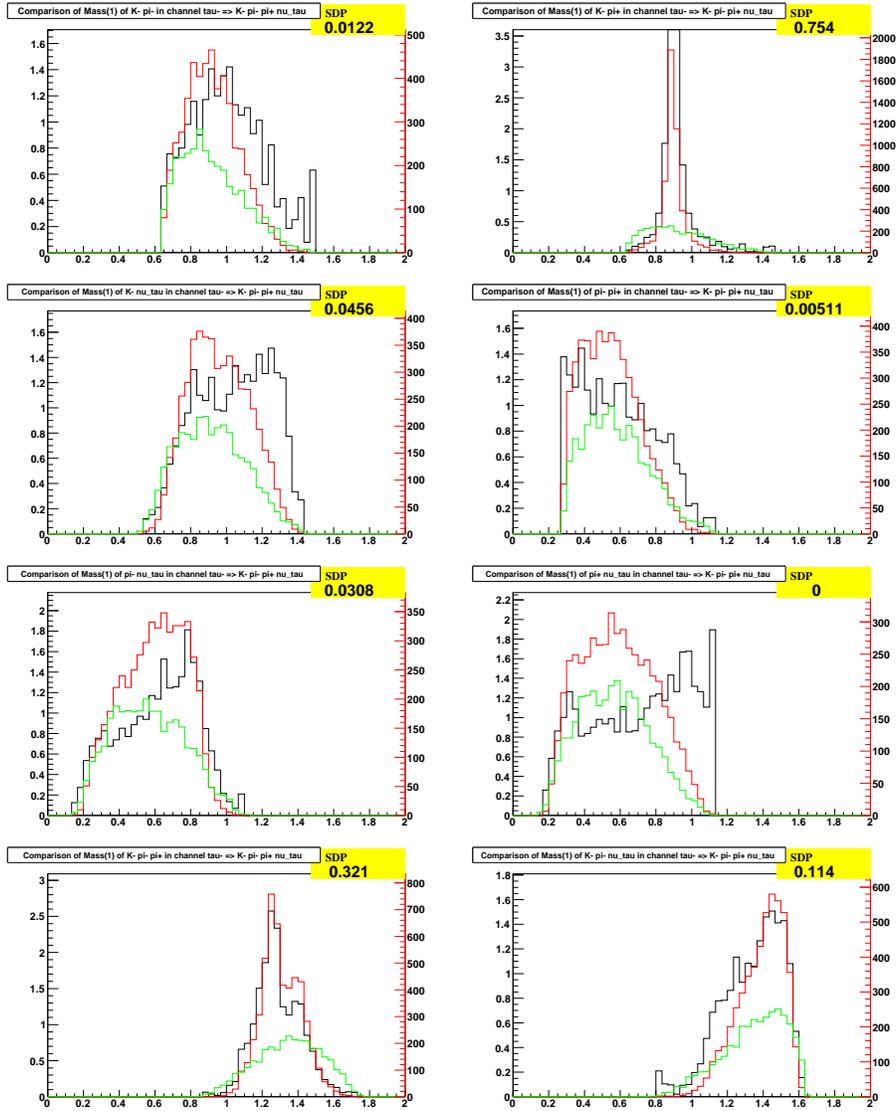
Number of events from generator 2: 6821

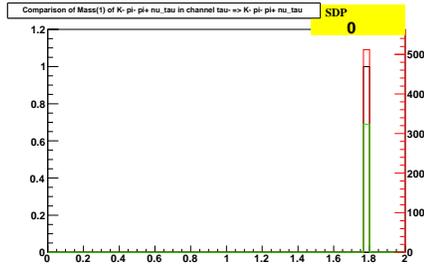
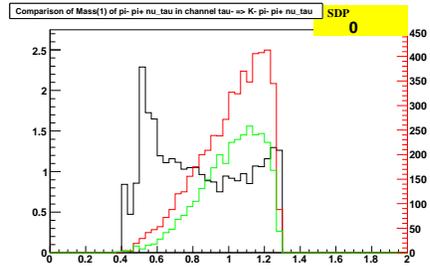
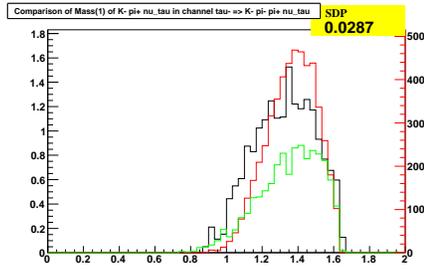


## 10 Decay Channel: $\tau^- \rightarrow K^- \pi^- \pi^+ \nu_\tau$

Number of events from generator 1: 5118

Number of events from generator 2: 3233

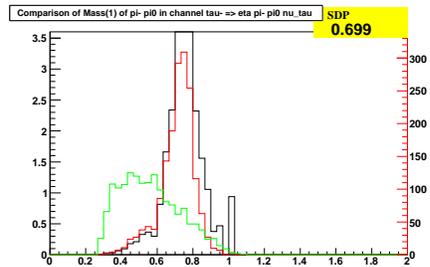
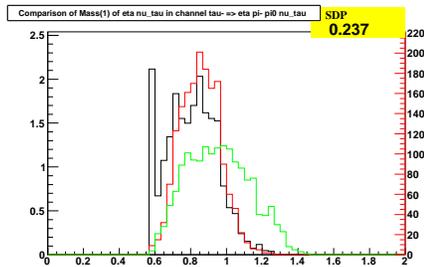
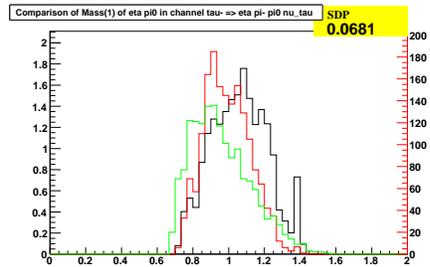
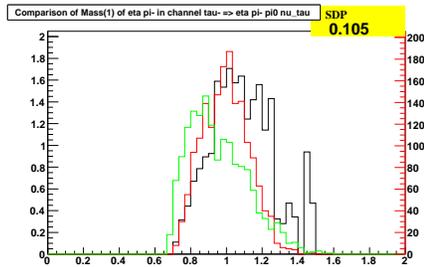


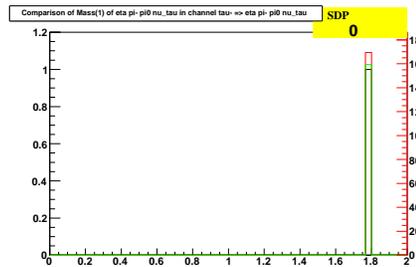
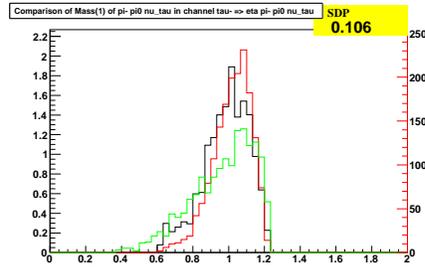
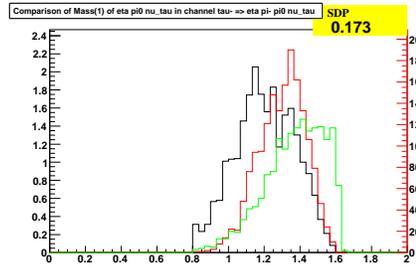
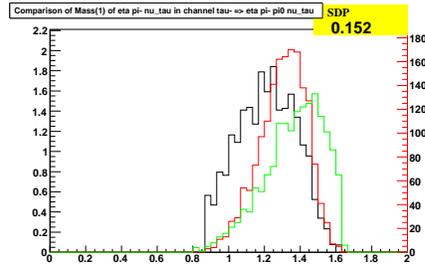
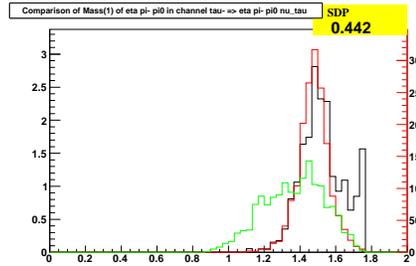
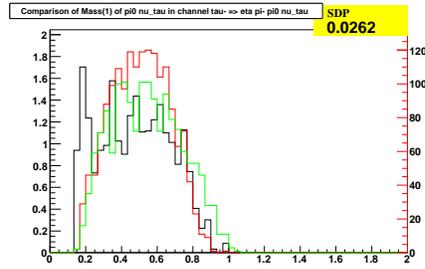
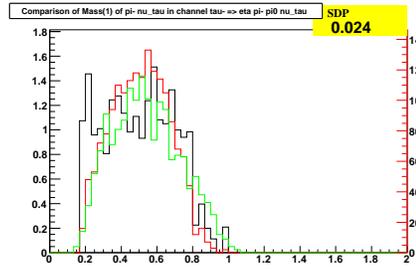


## 11 Decay Channel: $\tau^- \rightarrow \eta \pi^- \pi^0 \nu_\tau$

Number of events from generator 1: 1694

Number of events from generator 2: 1593

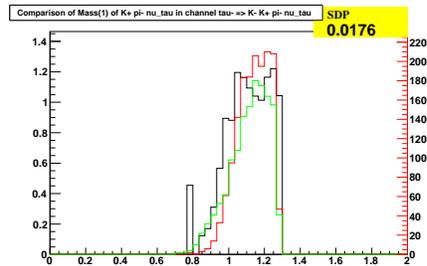
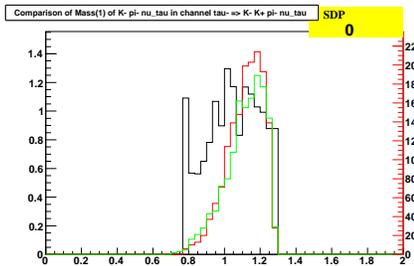
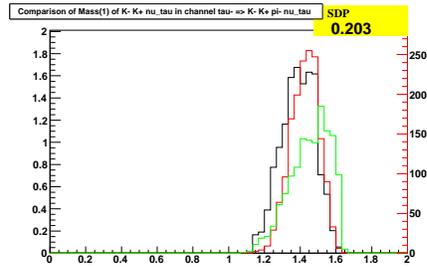
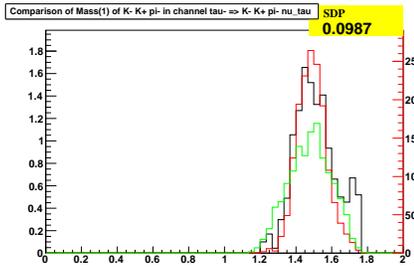
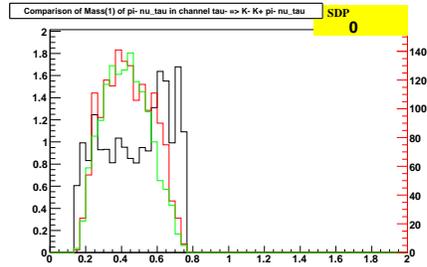
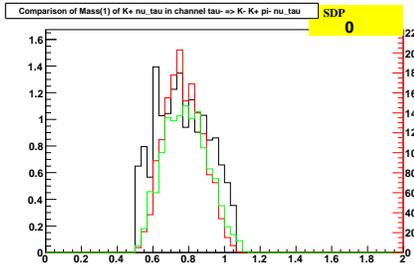
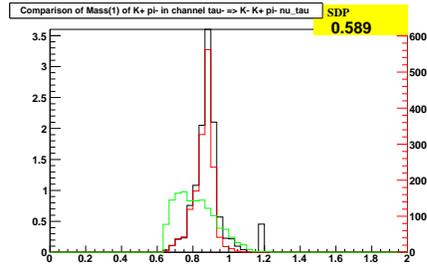
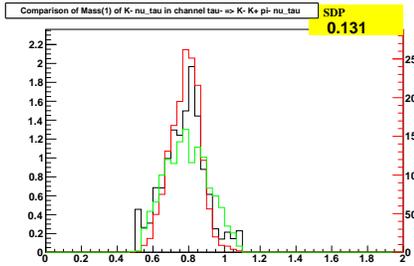
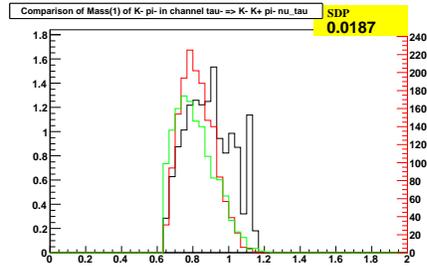
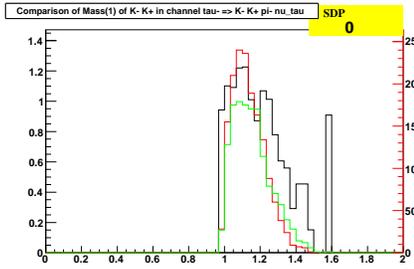


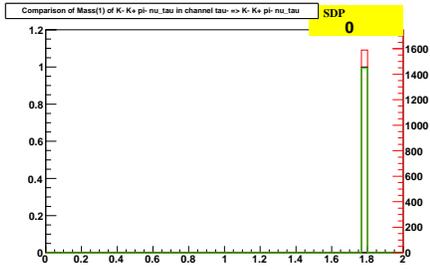


## 12 Decay Channel: $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$

Number of events from generator 1: 1589

Number of events from generator 2: 1445

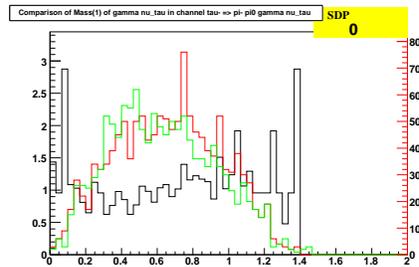
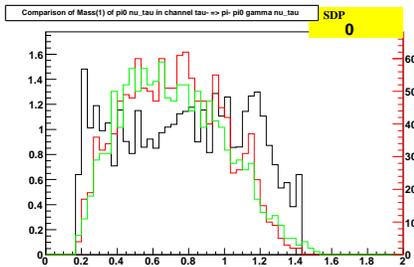
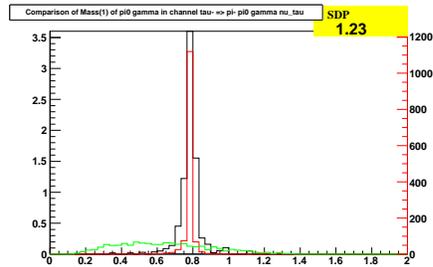
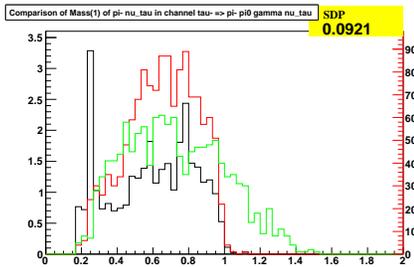
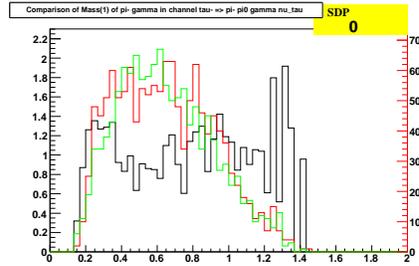
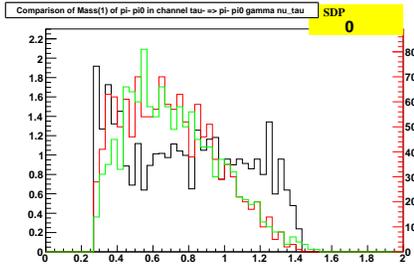


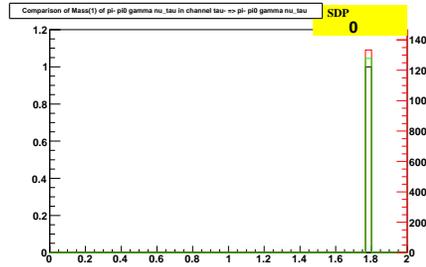
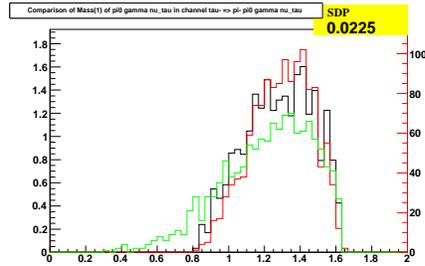
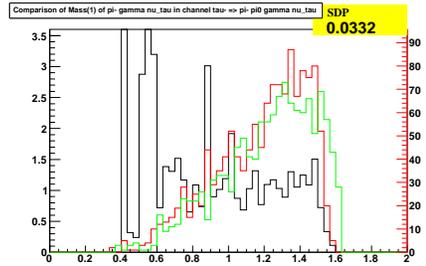
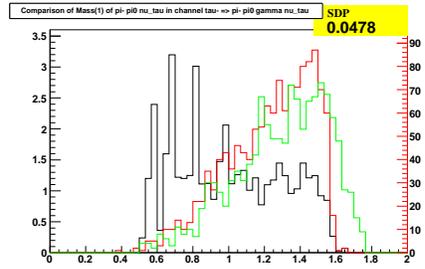
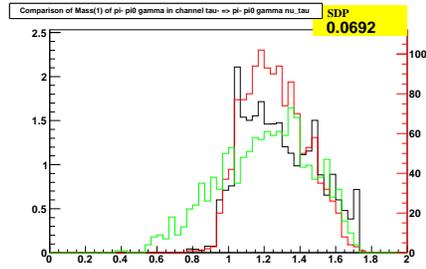


### 13 Decay Channel: $\tau^- \rightarrow \pi^- \pi^0 \gamma \nu_\tau$

Number of events from generator 1: 1334

Number of events from generator 2: 1279

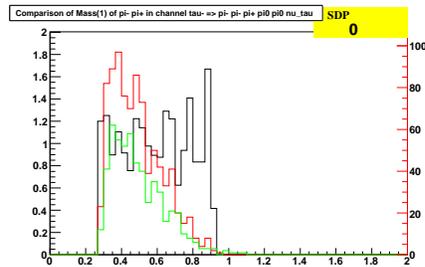
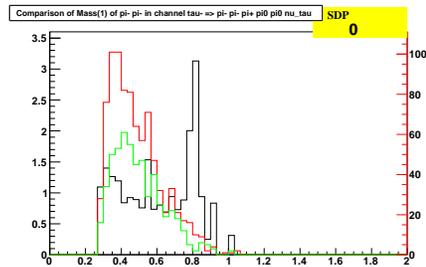


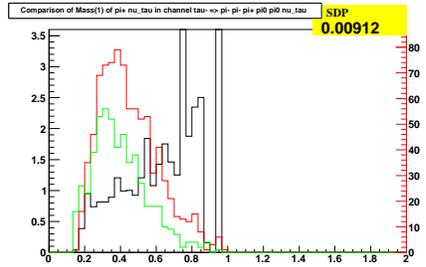
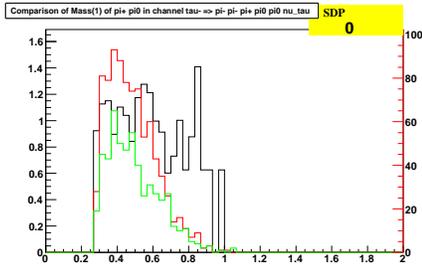
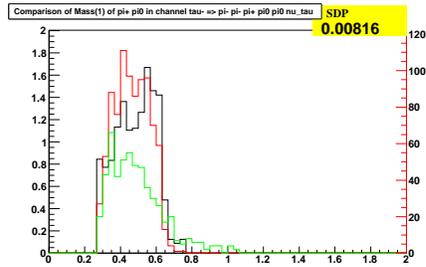
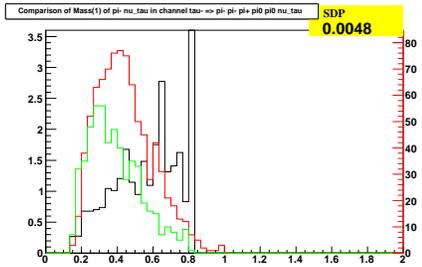
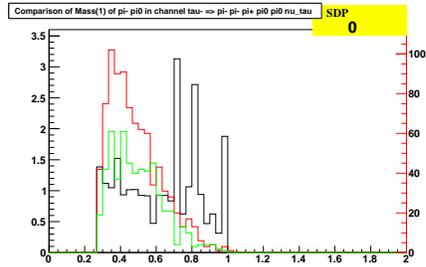
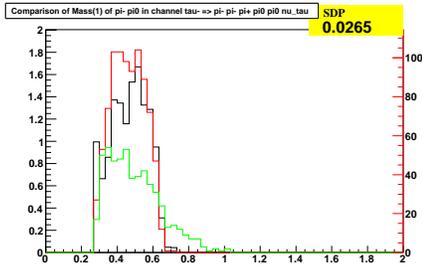
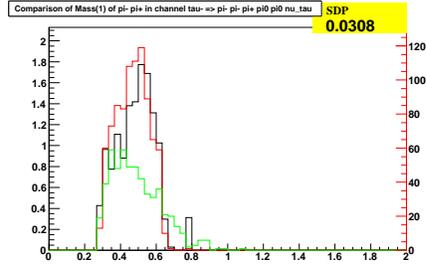
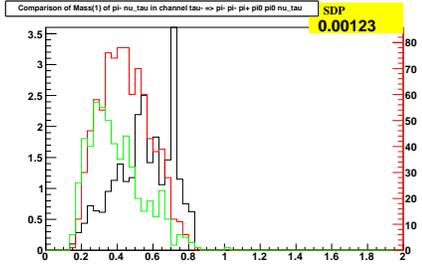
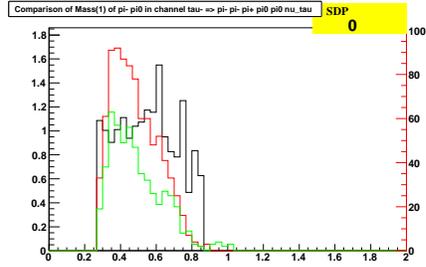
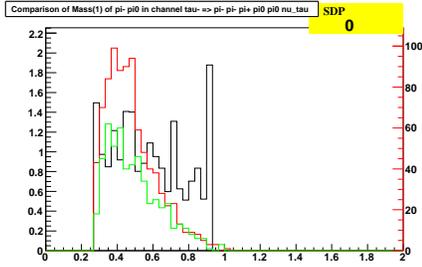


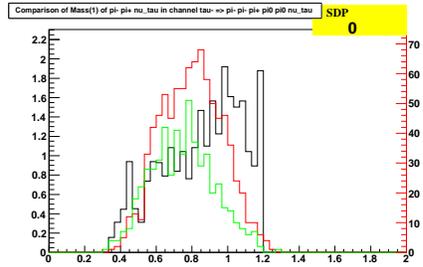
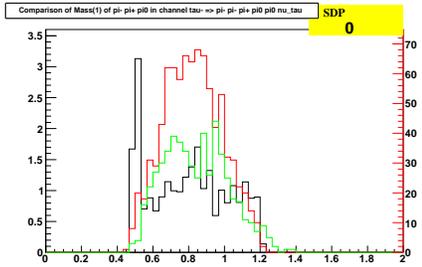
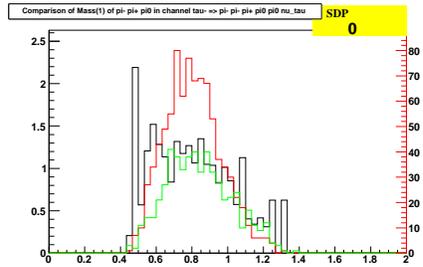
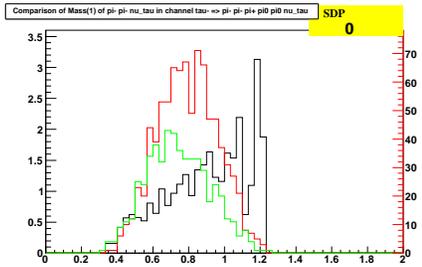
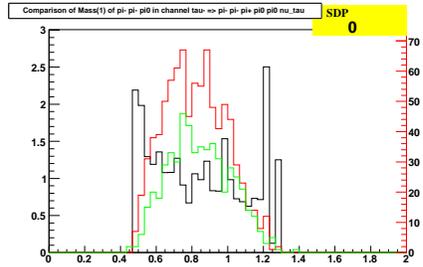
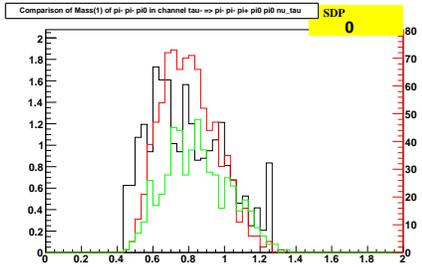
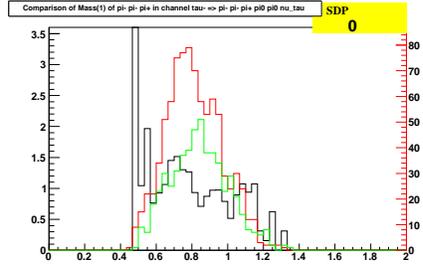
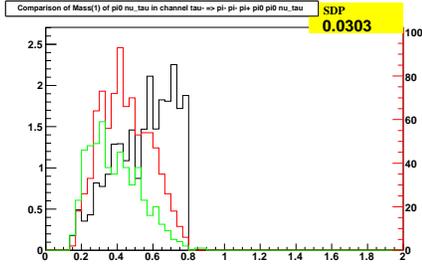
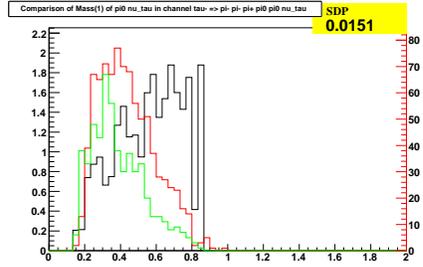
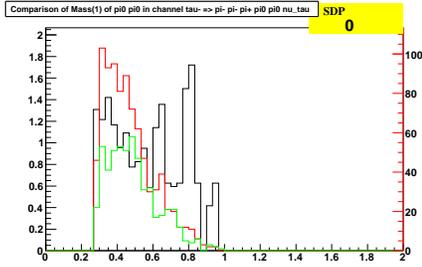
## 14 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \pi^0 \nu_\tau$

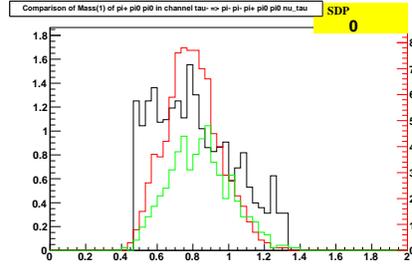
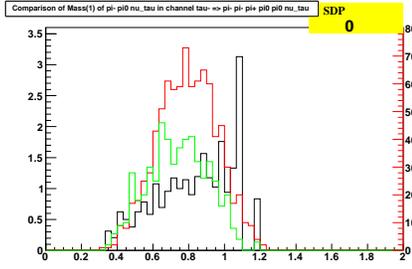
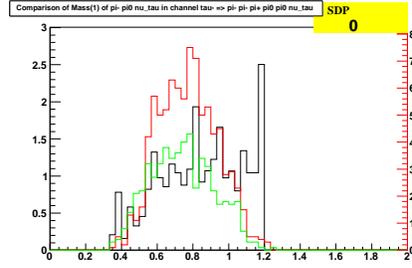
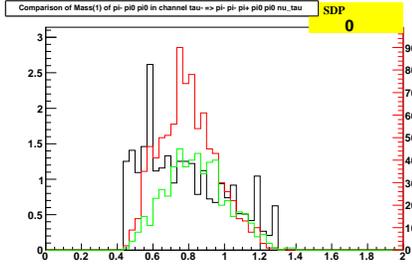
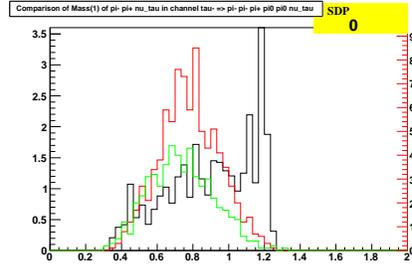
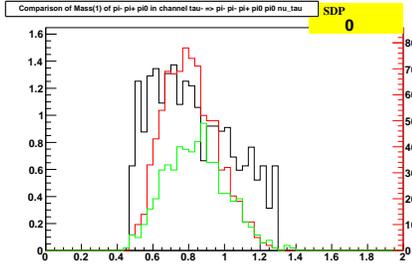
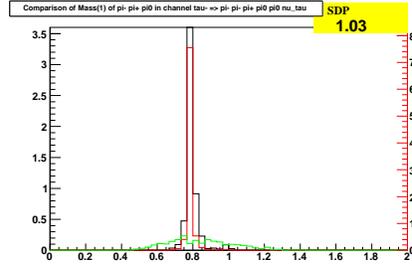
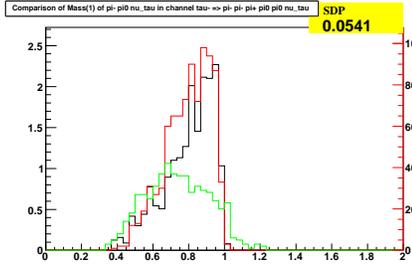
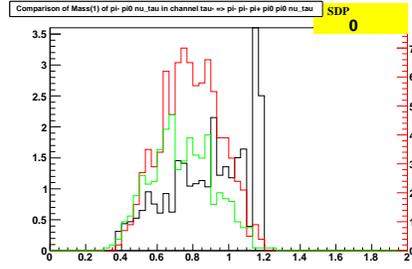
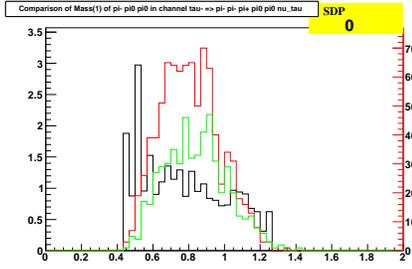
Number of events from generator 1: 877

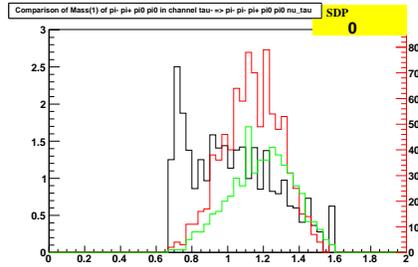
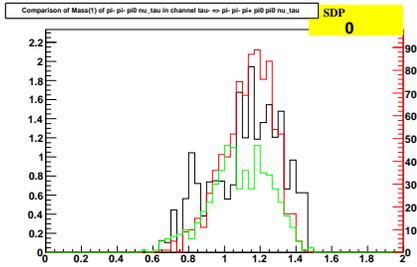
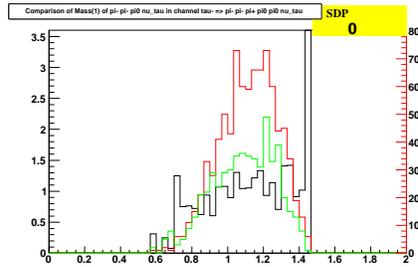
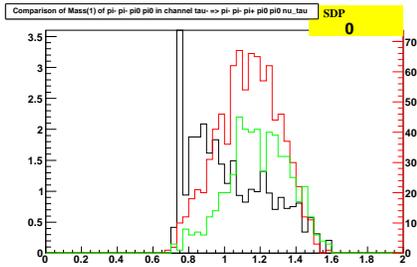
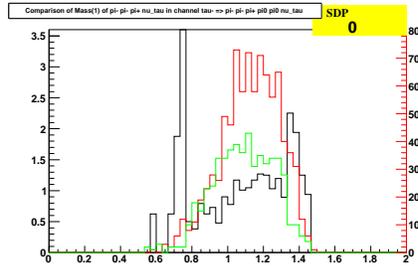
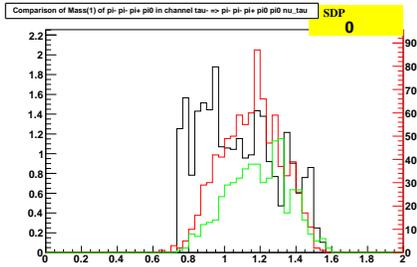
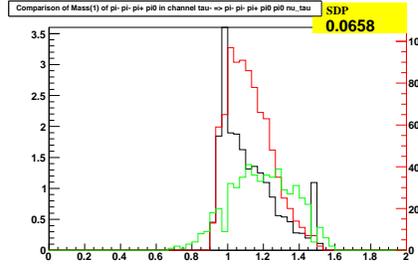
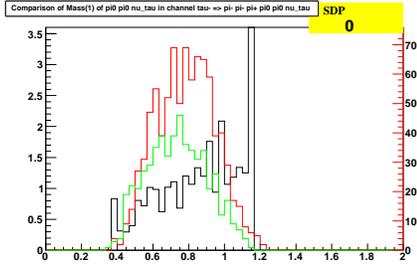
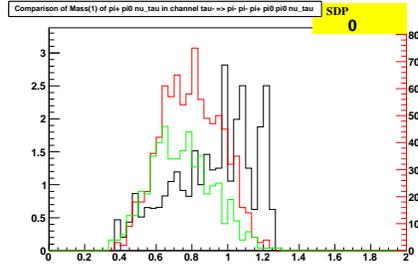
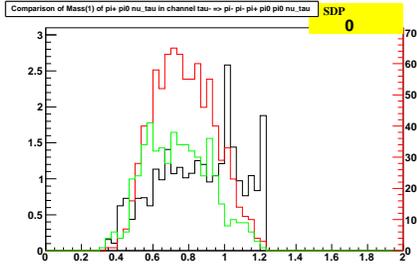
Number of events from generator 2: 549

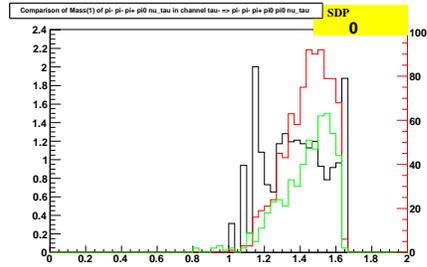
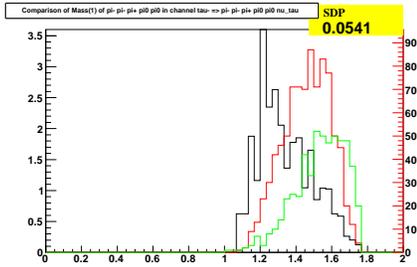
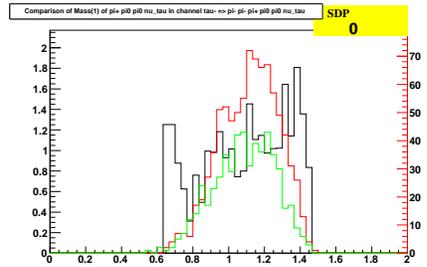
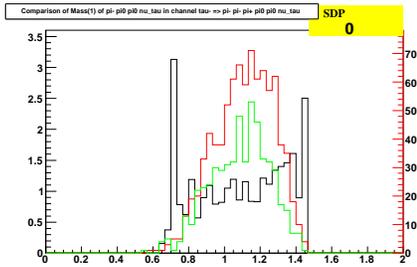
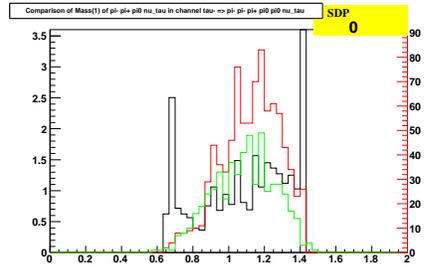
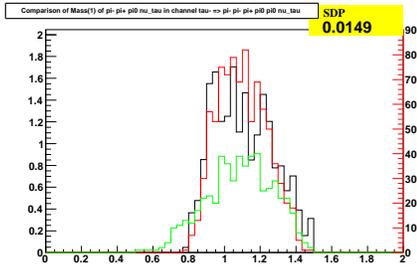
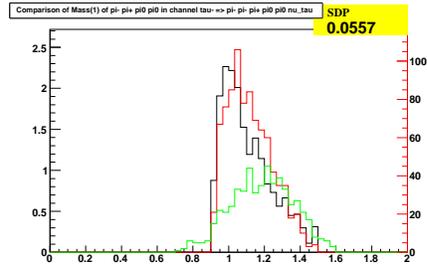
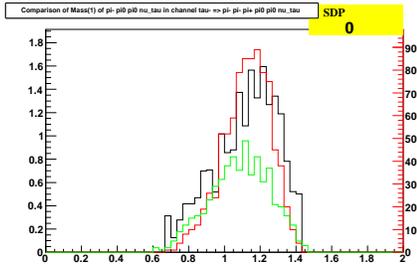
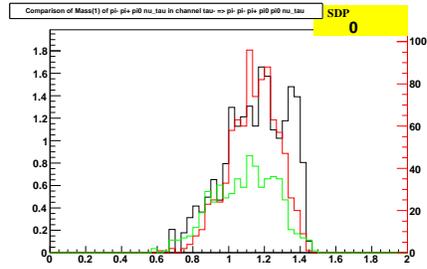
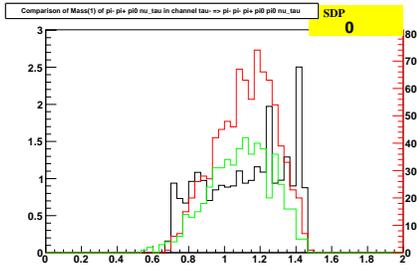


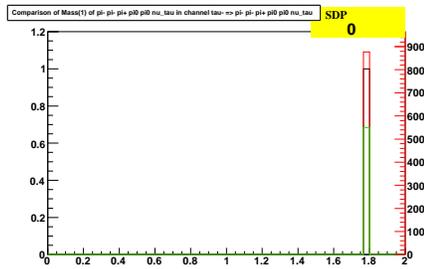
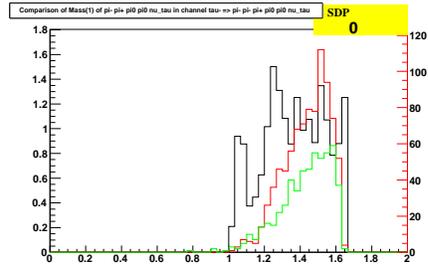
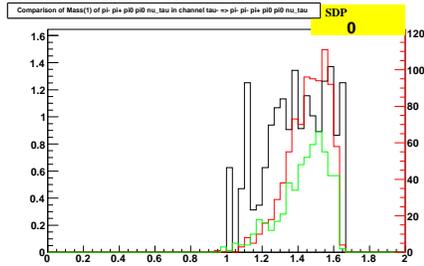
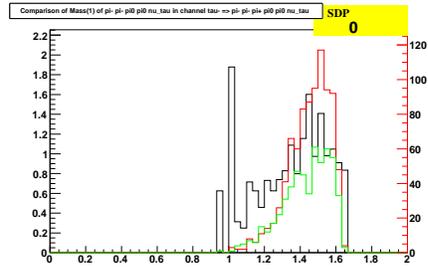
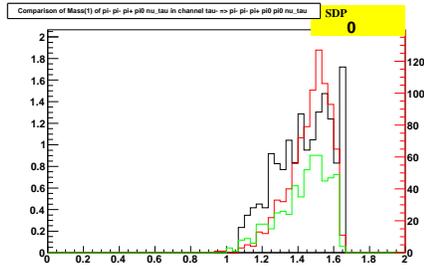








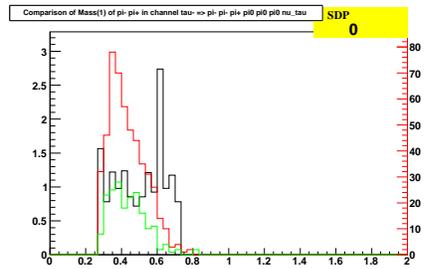
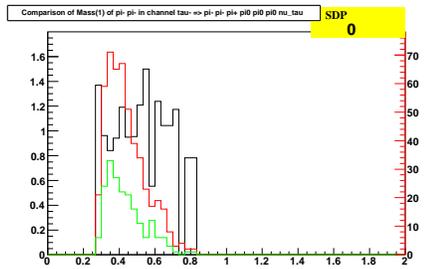


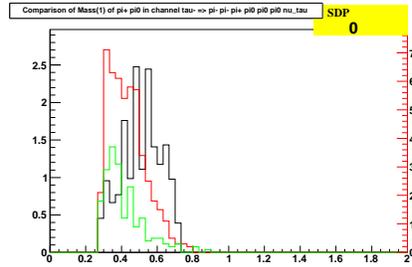
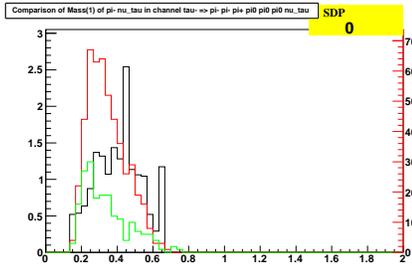
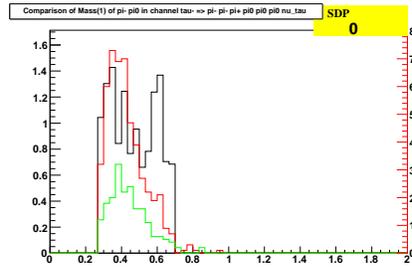
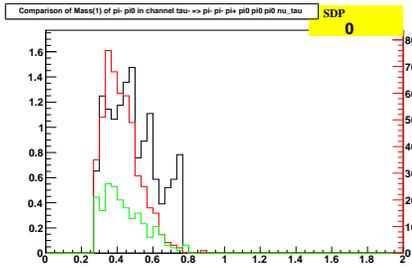
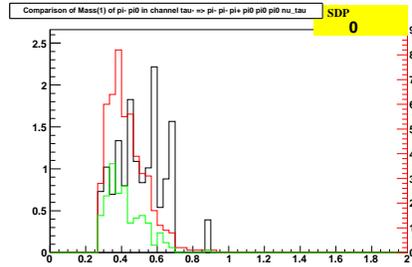
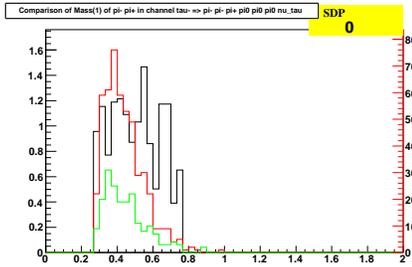
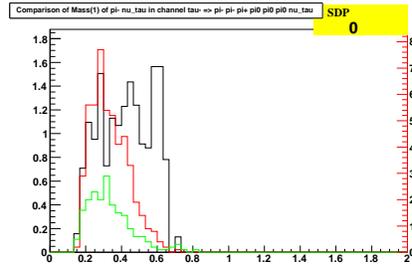
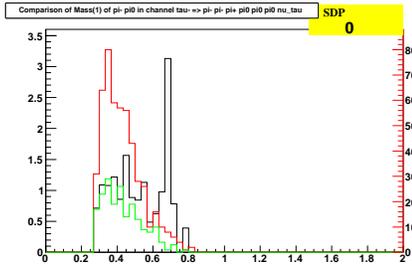
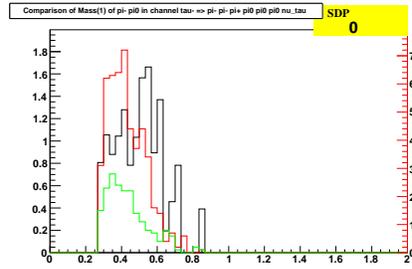
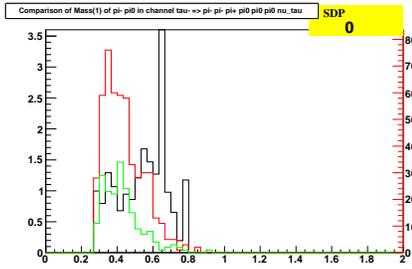


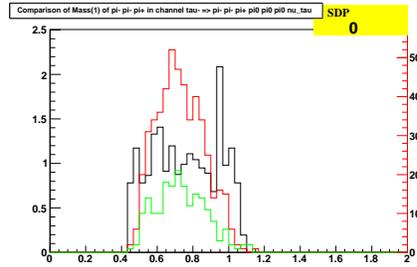
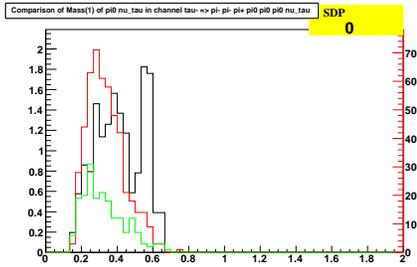
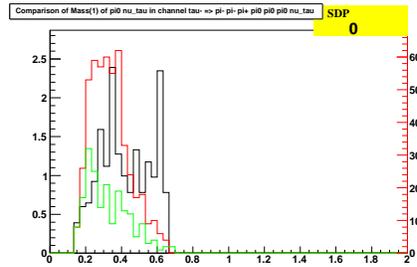
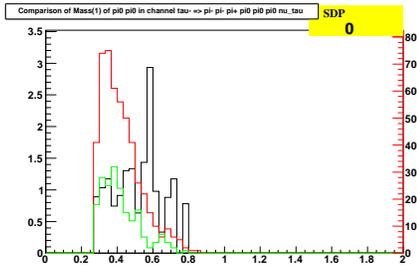
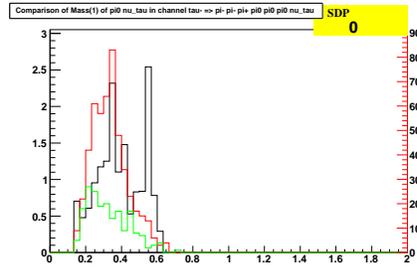
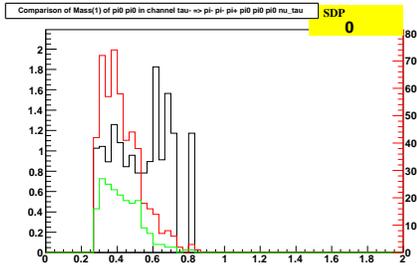
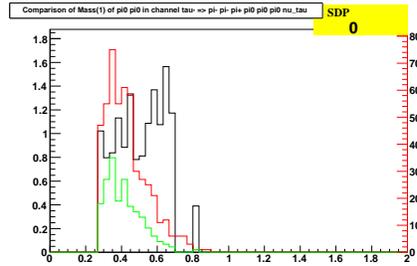
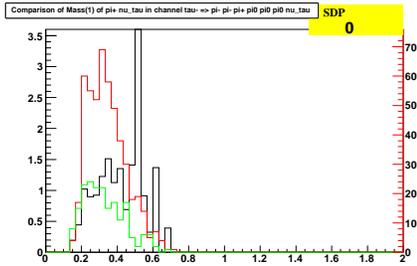
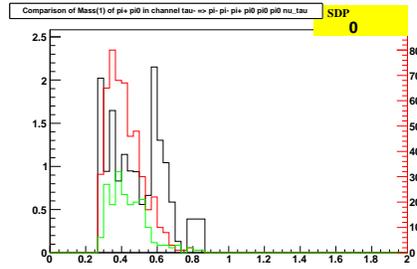
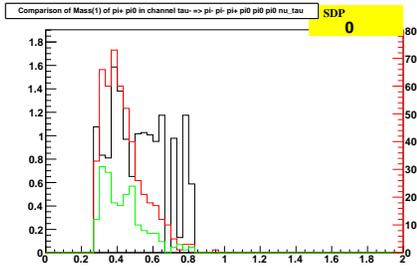
## 15 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^+ \pi^0 \pi^0 \nu_\tau$

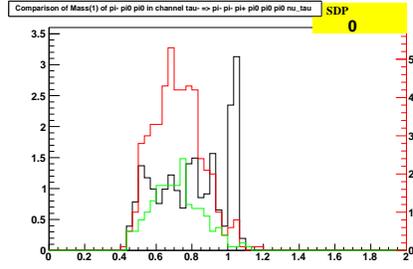
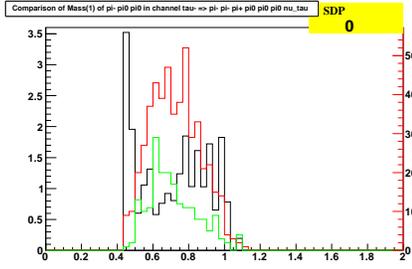
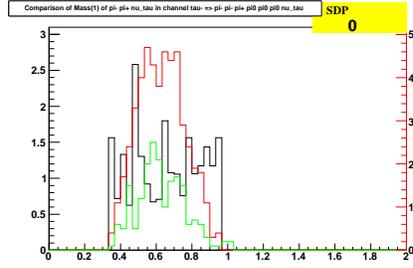
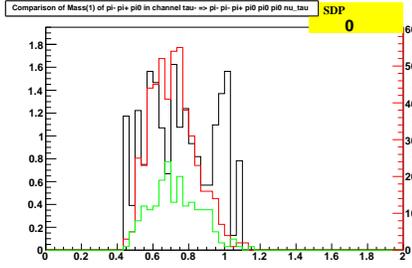
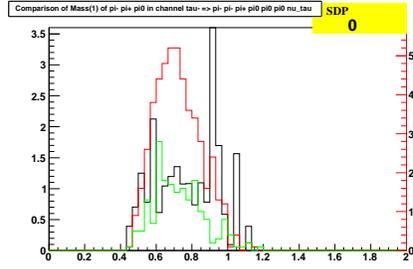
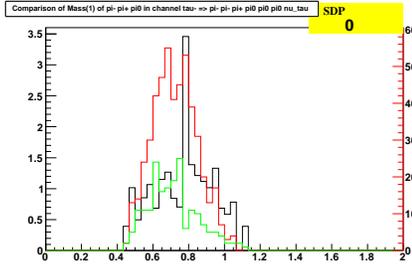
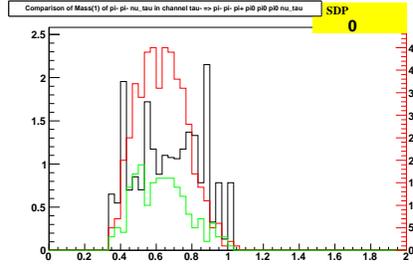
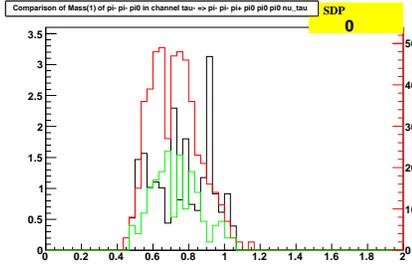
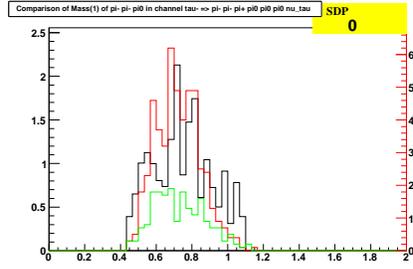
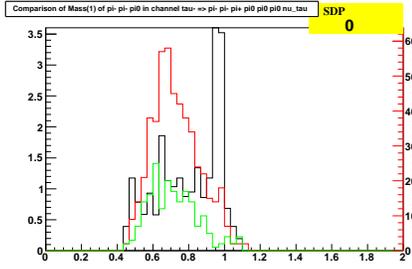
Number of events from generator 1: 501

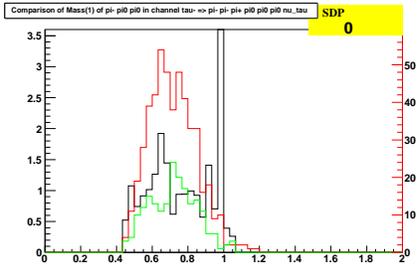
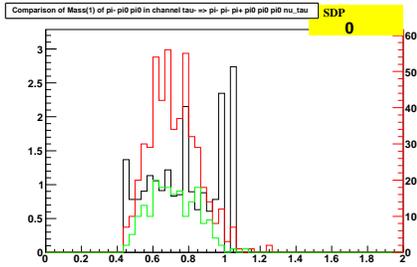
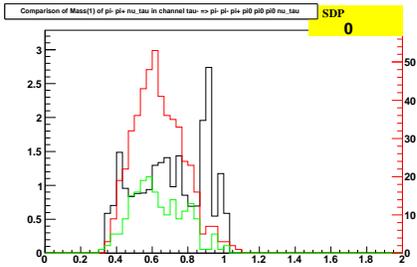
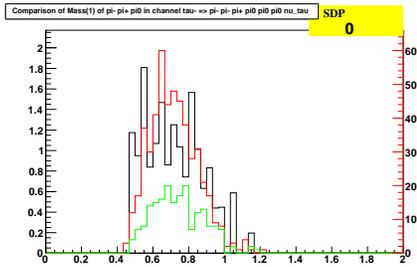
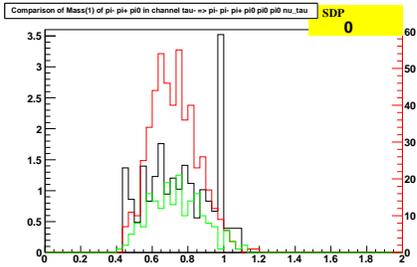
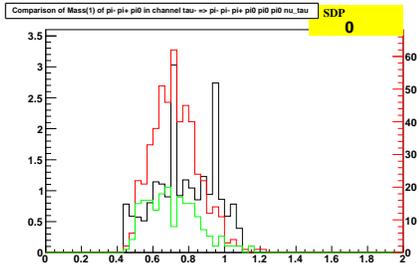
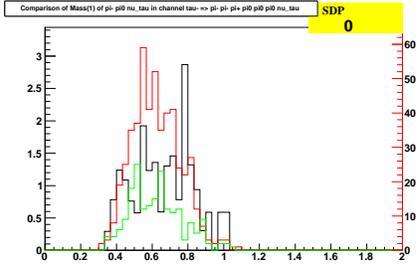
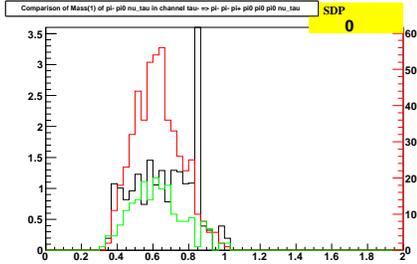
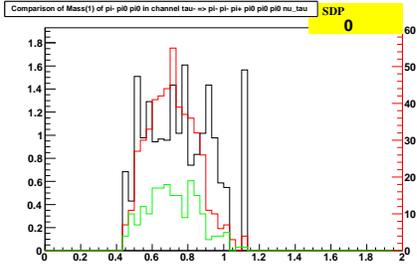
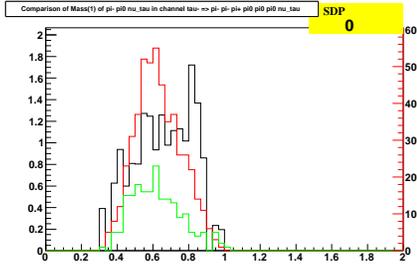
Number of events from generator 2: 196

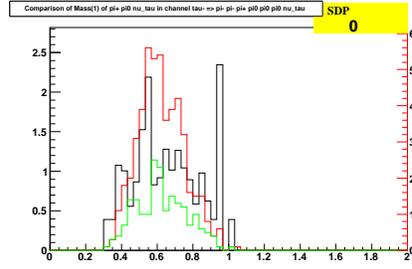
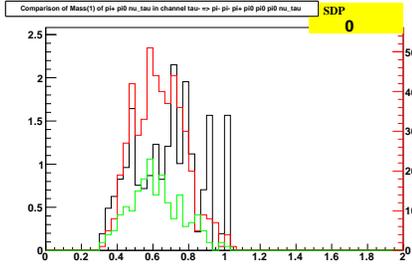
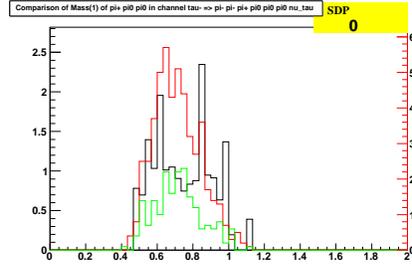
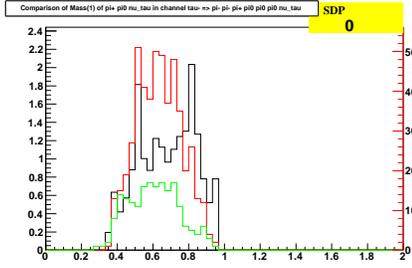
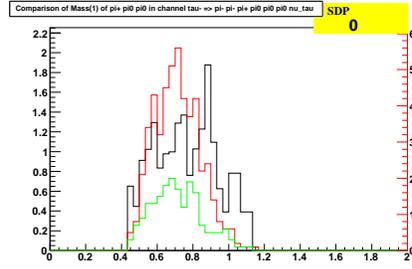
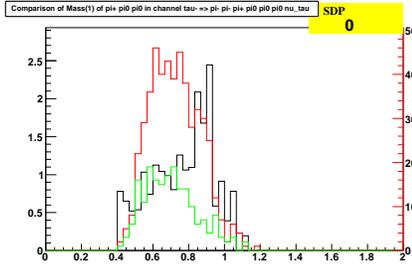
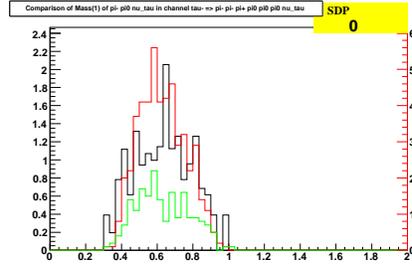
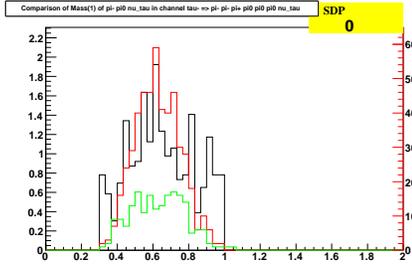
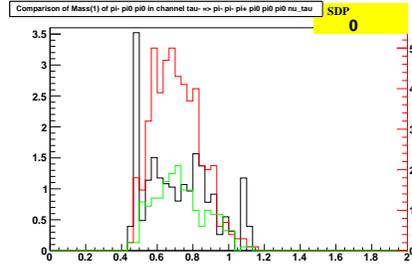
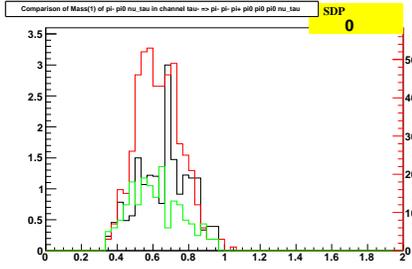


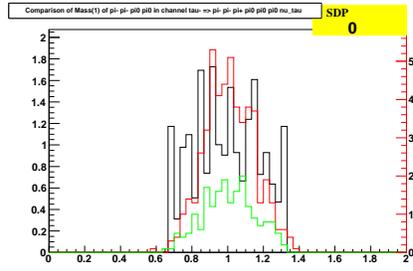
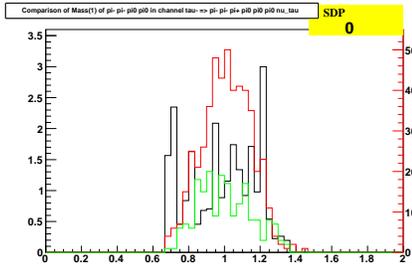
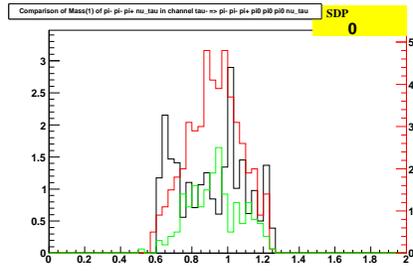
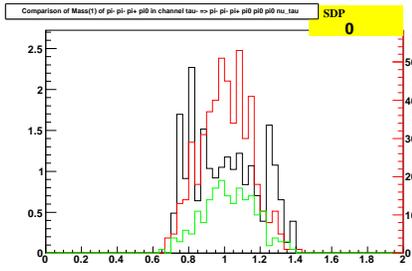
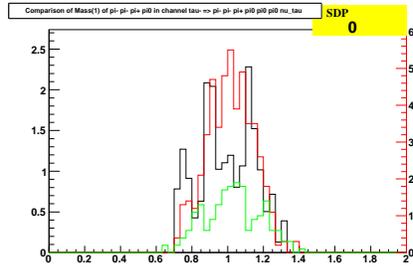
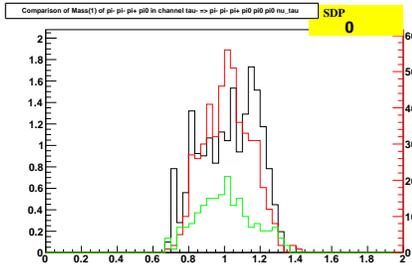
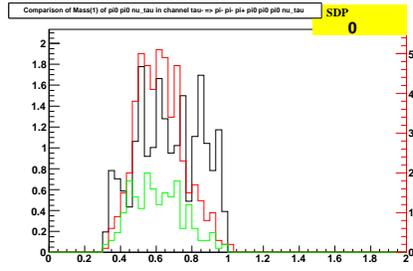
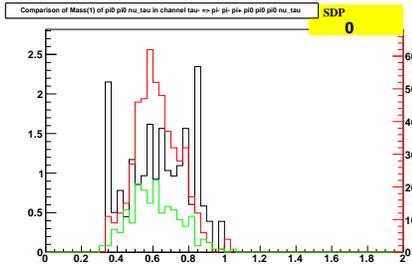
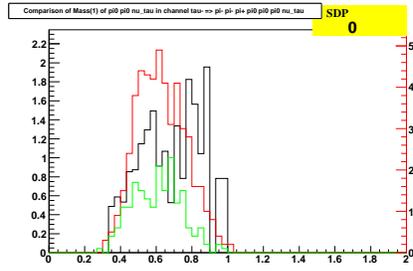
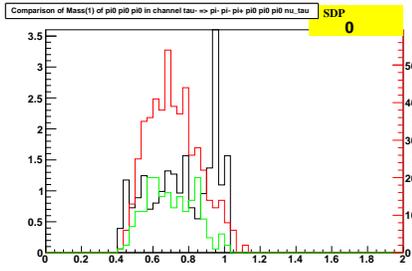


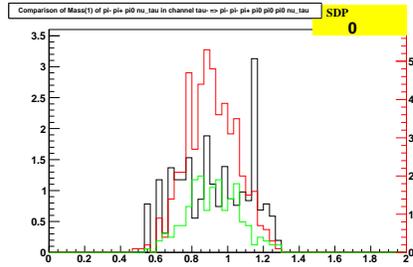
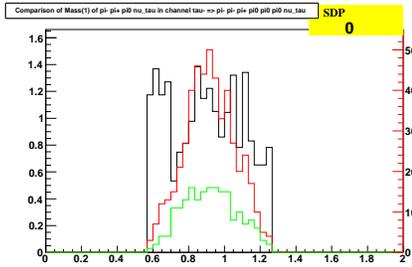
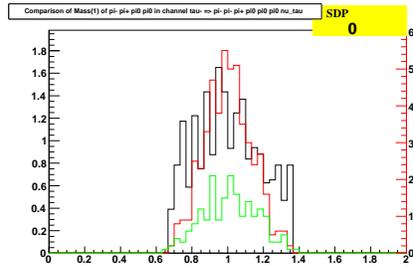
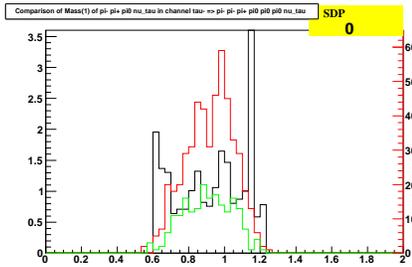
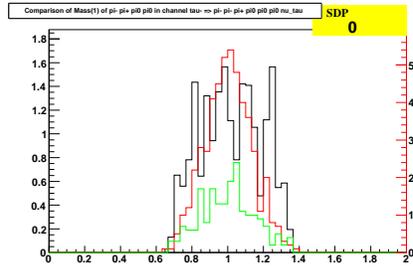
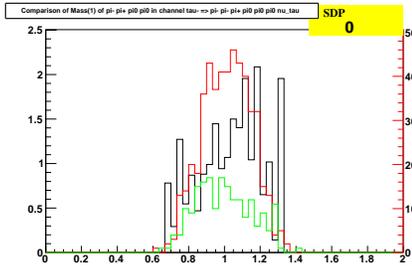
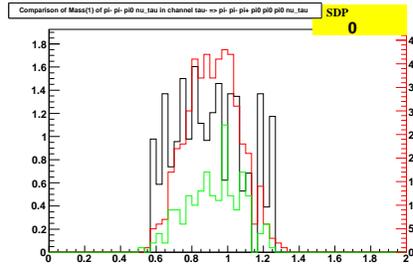
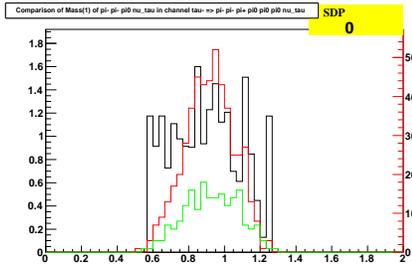
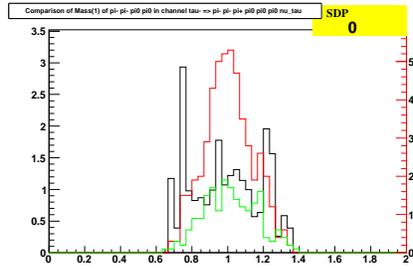
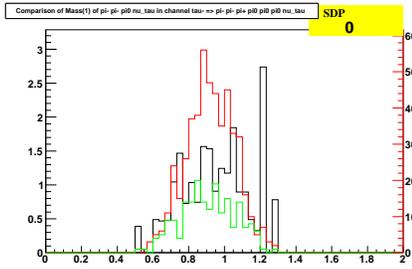


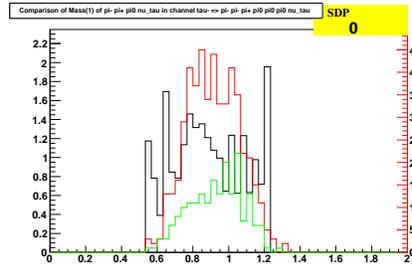
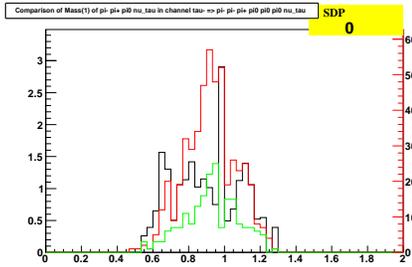
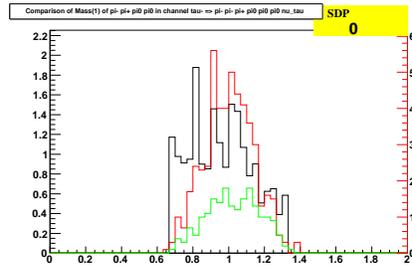
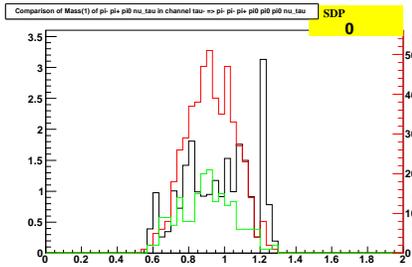
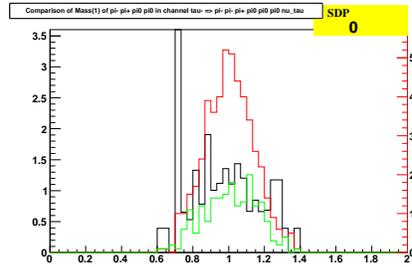
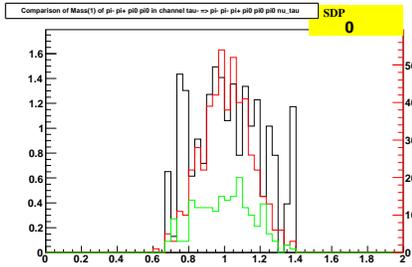
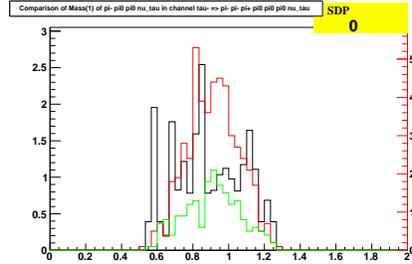
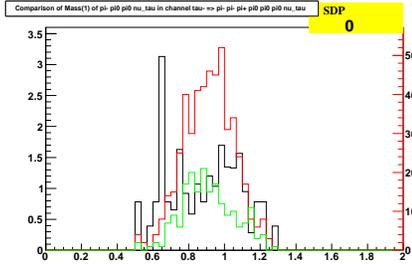
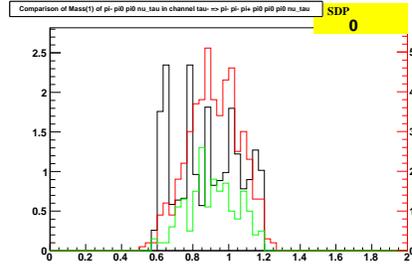
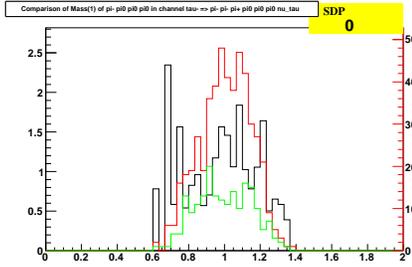


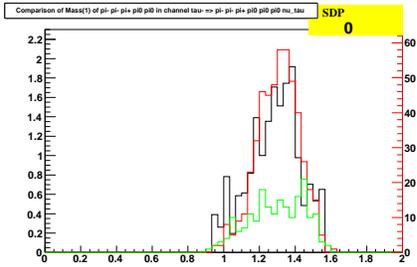
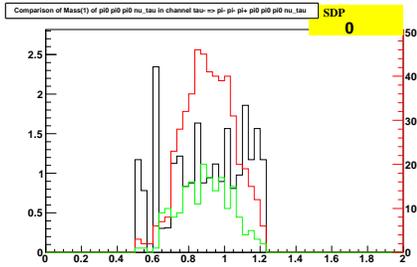
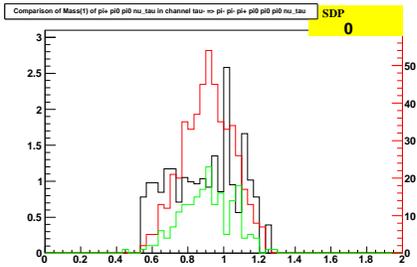
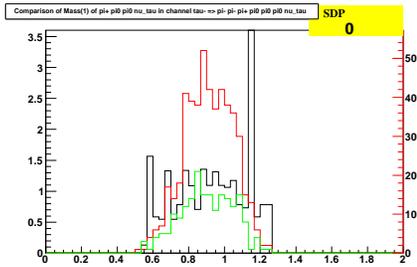
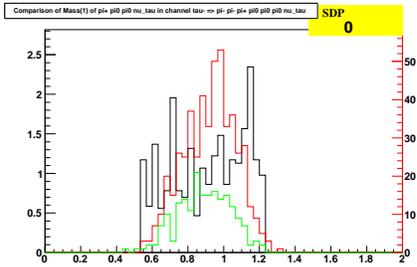
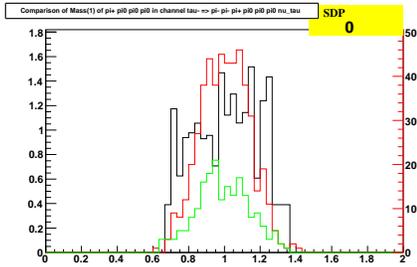
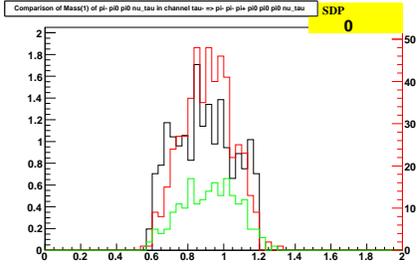
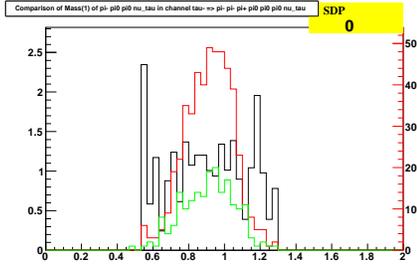
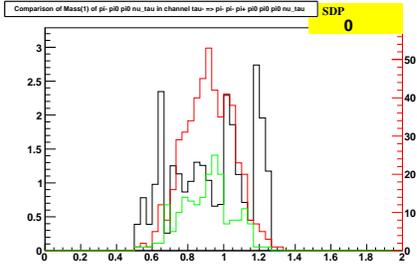
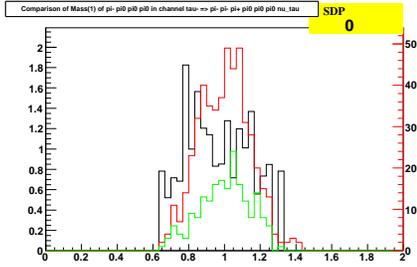




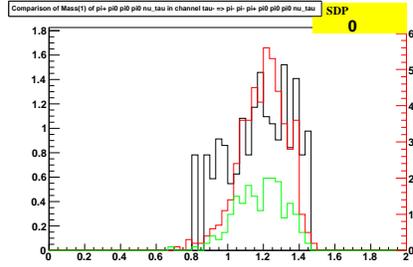
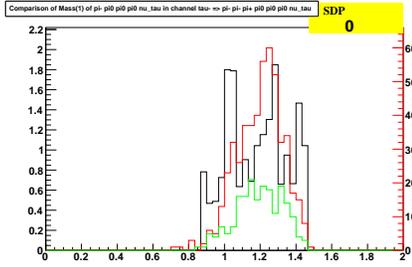
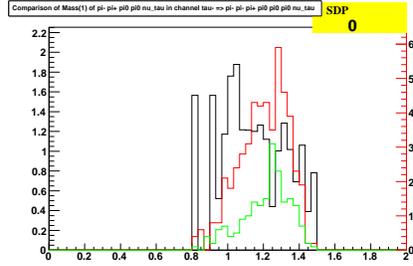
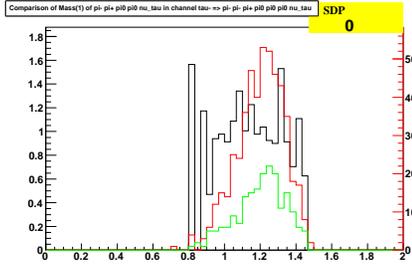
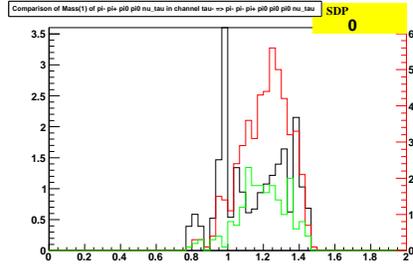
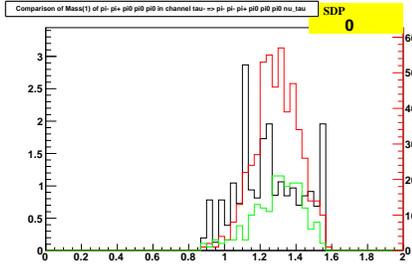
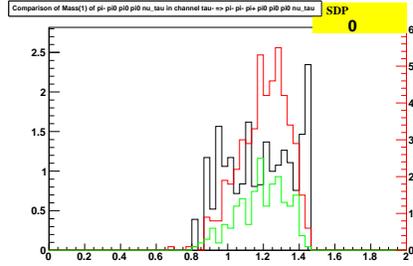
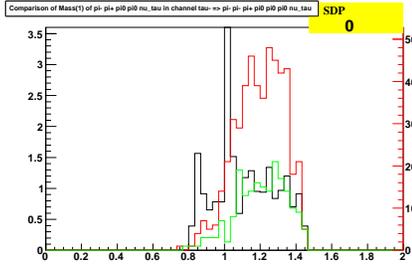
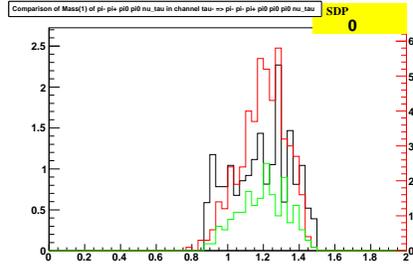
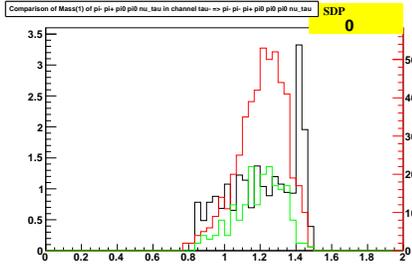


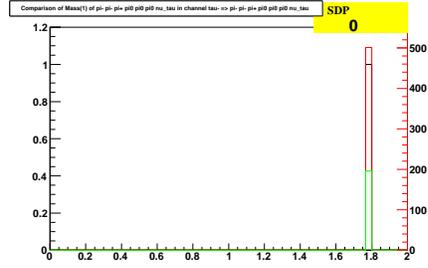
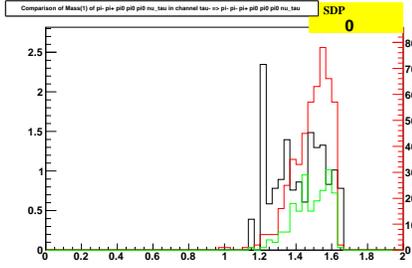
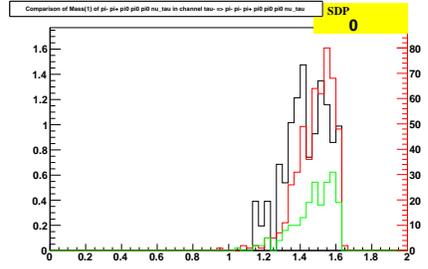
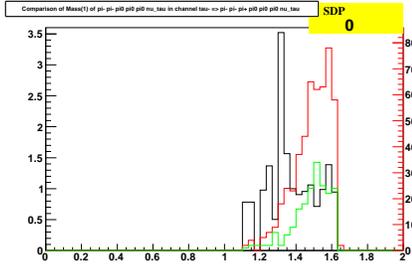
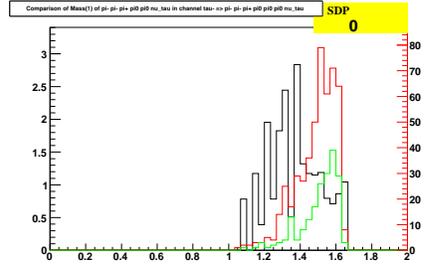
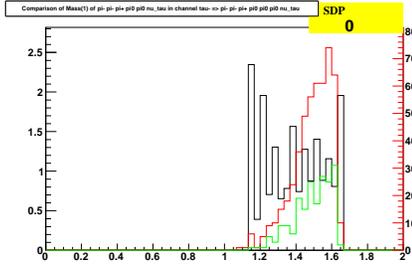
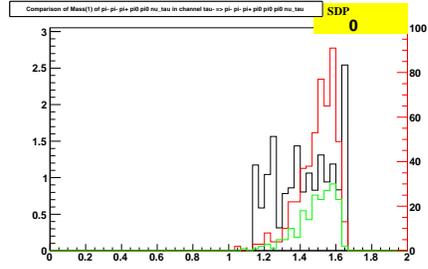
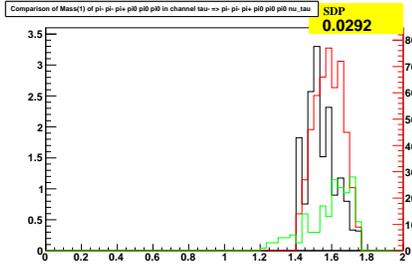








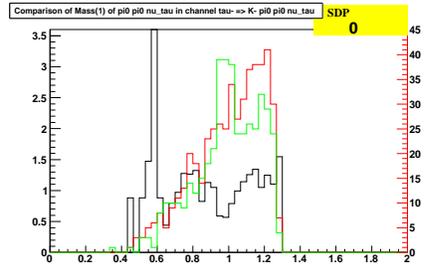
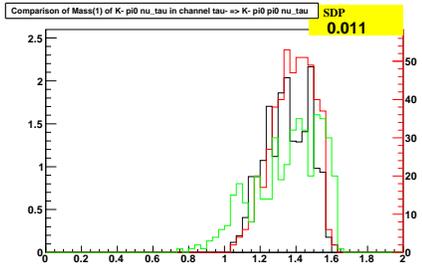
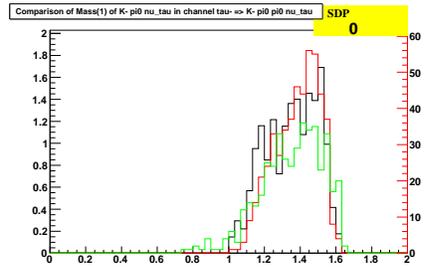
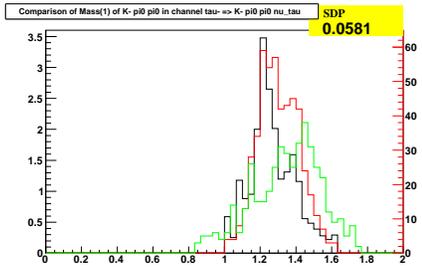
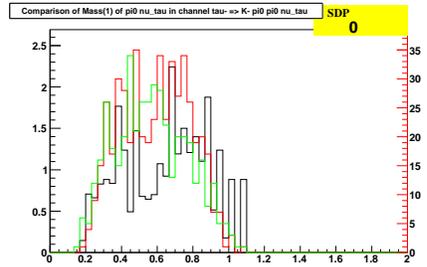
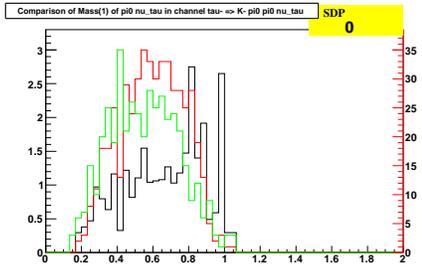
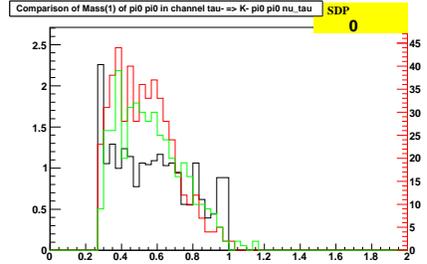
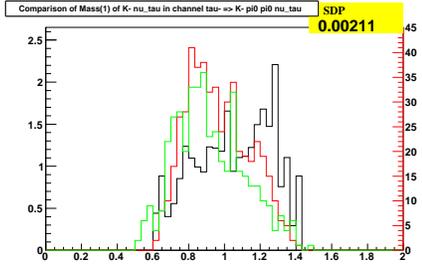
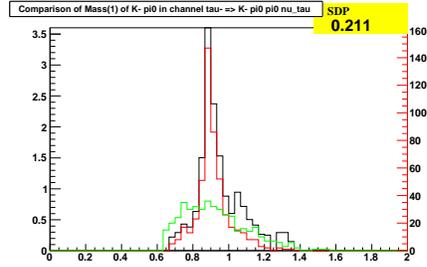
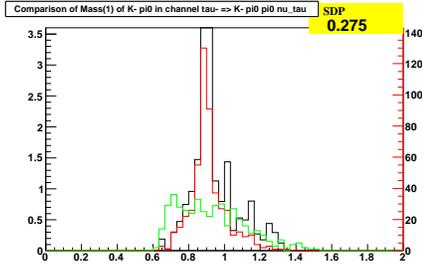


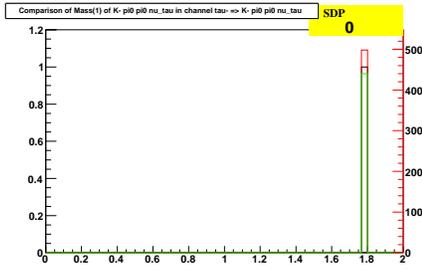


## 16 Decay Channel: $\tau^- \rightarrow K^- \pi^0 \pi^0 \nu_\tau$

Number of events from generator 1: 498

Number of events from generator 2: 440

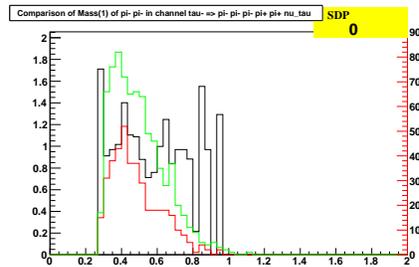
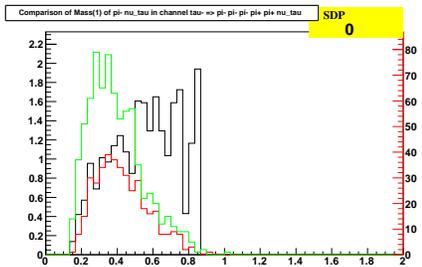
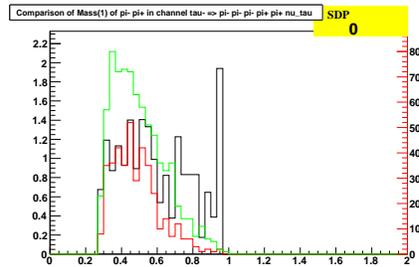
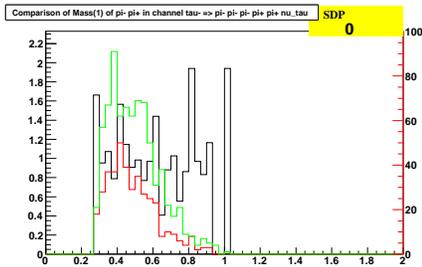
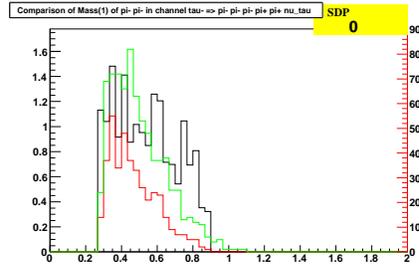
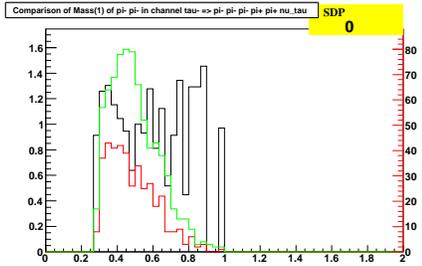


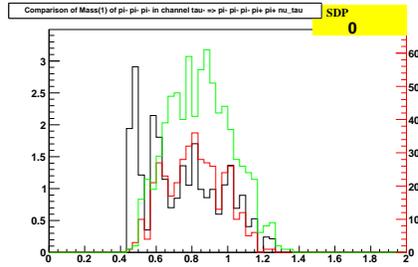
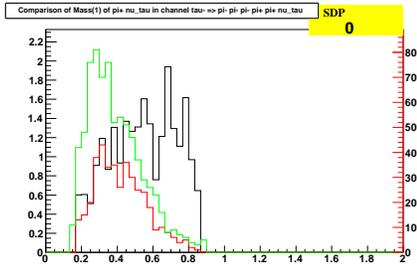
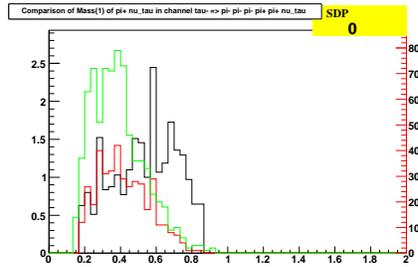
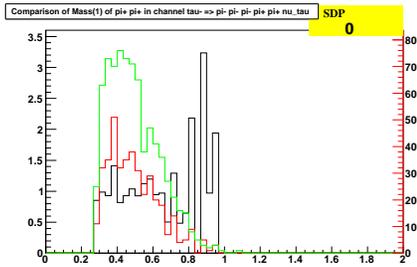
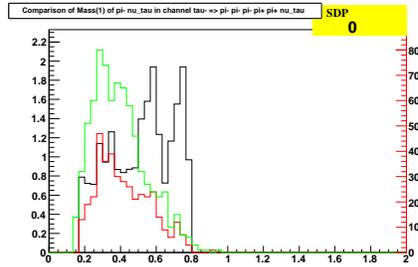
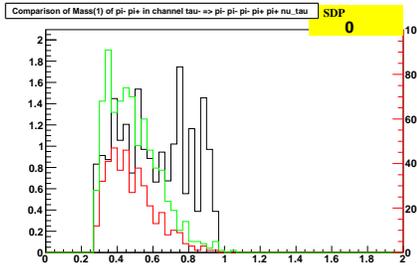
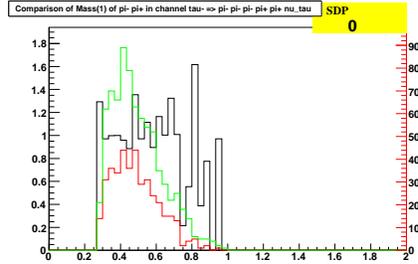
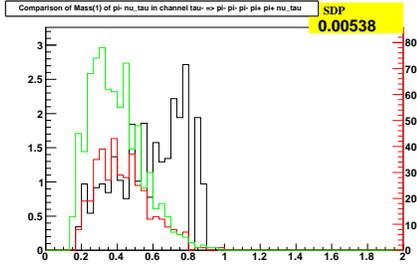
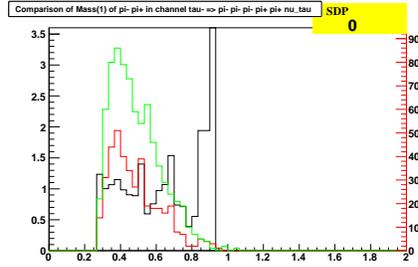
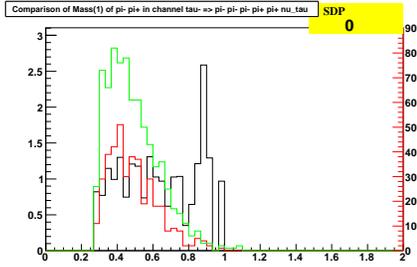


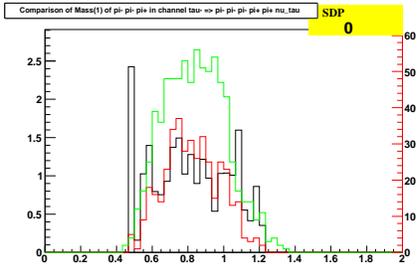
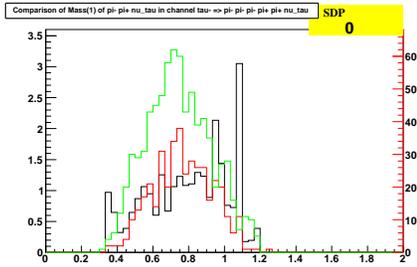
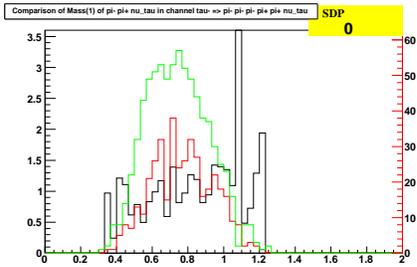
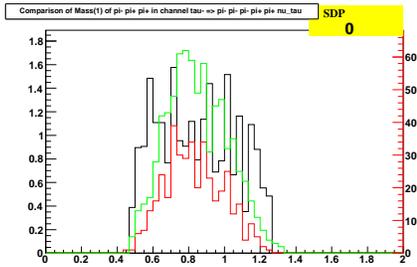
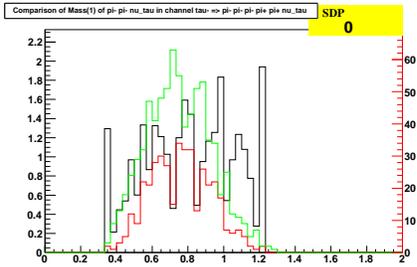
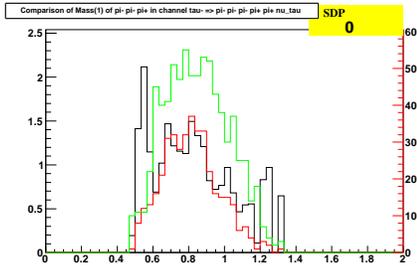
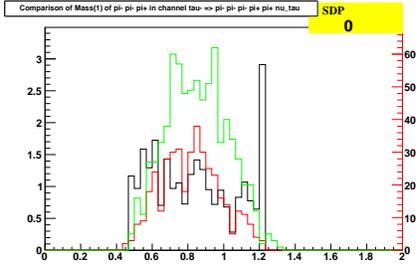
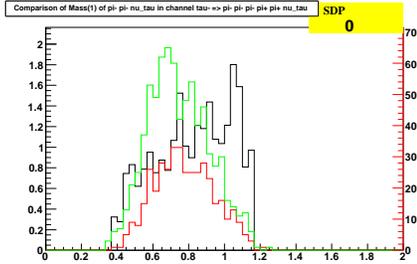
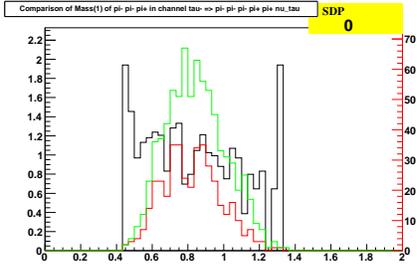
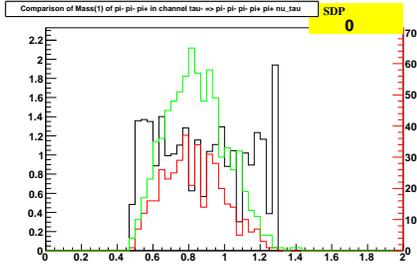
## 17 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^- \pi^+ \pi^+ \nu_\tau$

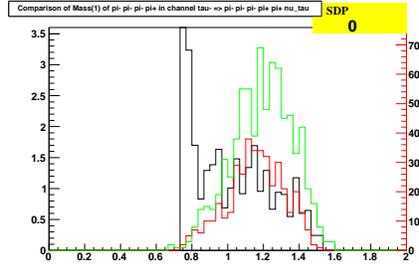
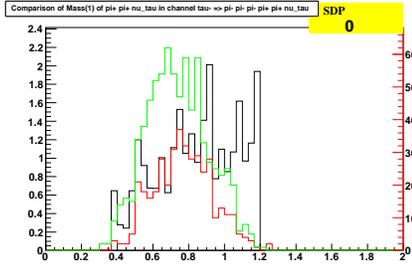
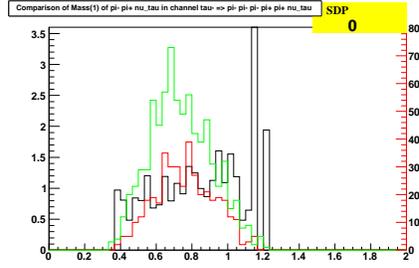
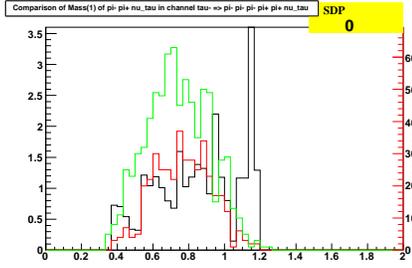
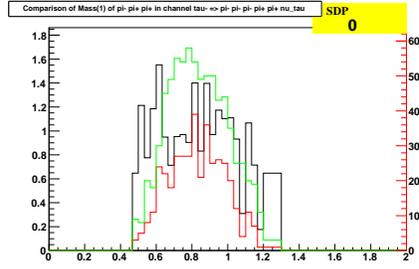
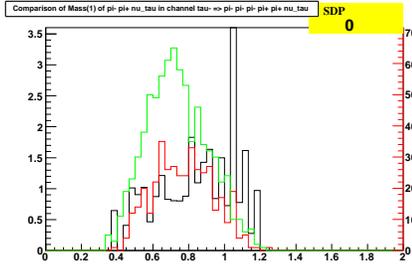
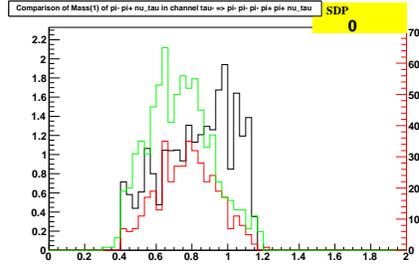
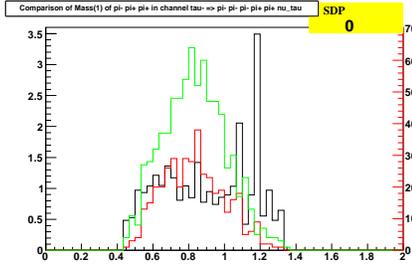
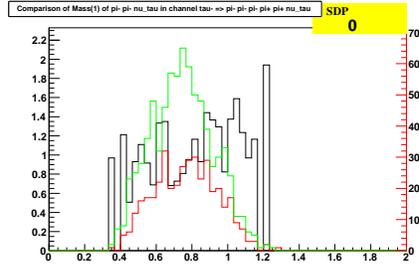
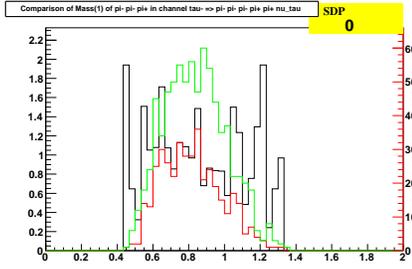
Number of events from generator 1: 402

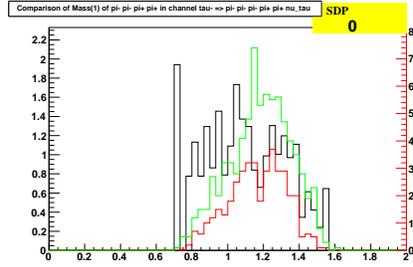
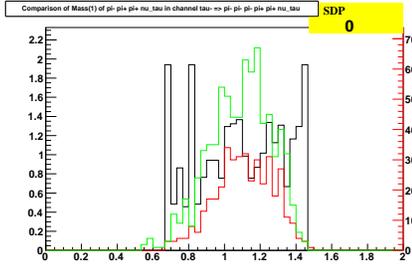
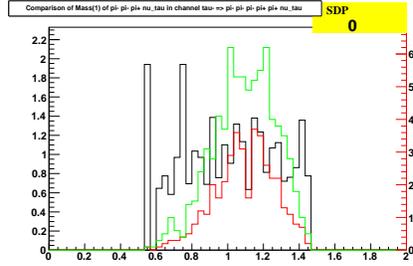
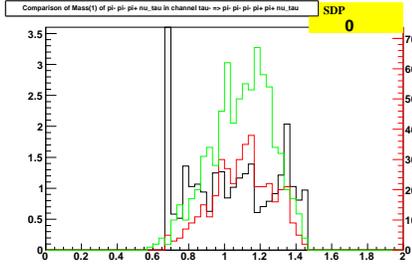
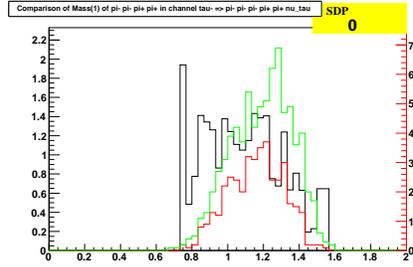
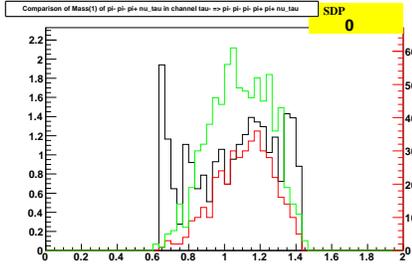
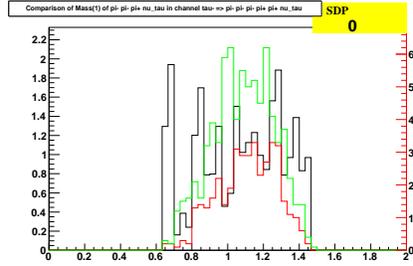
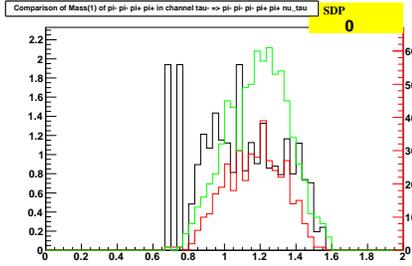
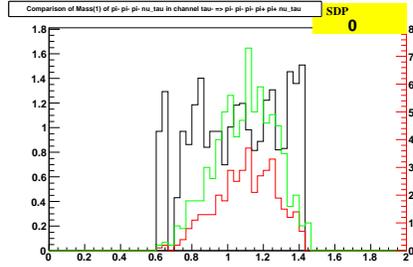
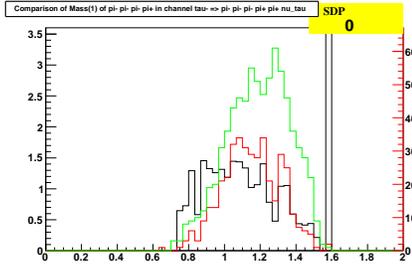
Number of events from generator 2: 780



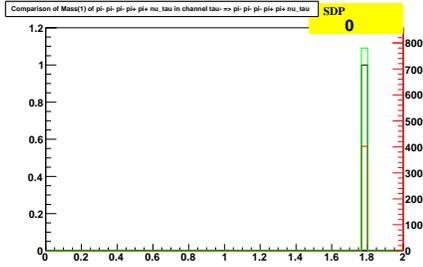












## 18 Decay Channel: $\tau^- \rightarrow \pi^- \pi^- \pi^- \pi^+ \pi^+ \pi^0 \nu_\tau$

Number of events from generator 1: 303

Number of events from generator 2: 166

