

Testing xdvmp

R.Debbe BNL

I have installed xdvmp and run in several settings to attempt a comparison to HERA data.

The parameters for xdvmp are:

```
eBeamEnergy = 27.5
pBeamEnergy = 920
vectorMeson = jpsi
dipoleModel = bCGC or bSat
waveFunction = BoostedGaussian
numberOfEvents = 10000
timesToShow = 10
rootfile = Breitweg97w_40_60Q01.root
Q2min = 0.1
Q2max = 4
Wmin = 40
Wmax = 60
tmin = -1.0
tmax = 0
```

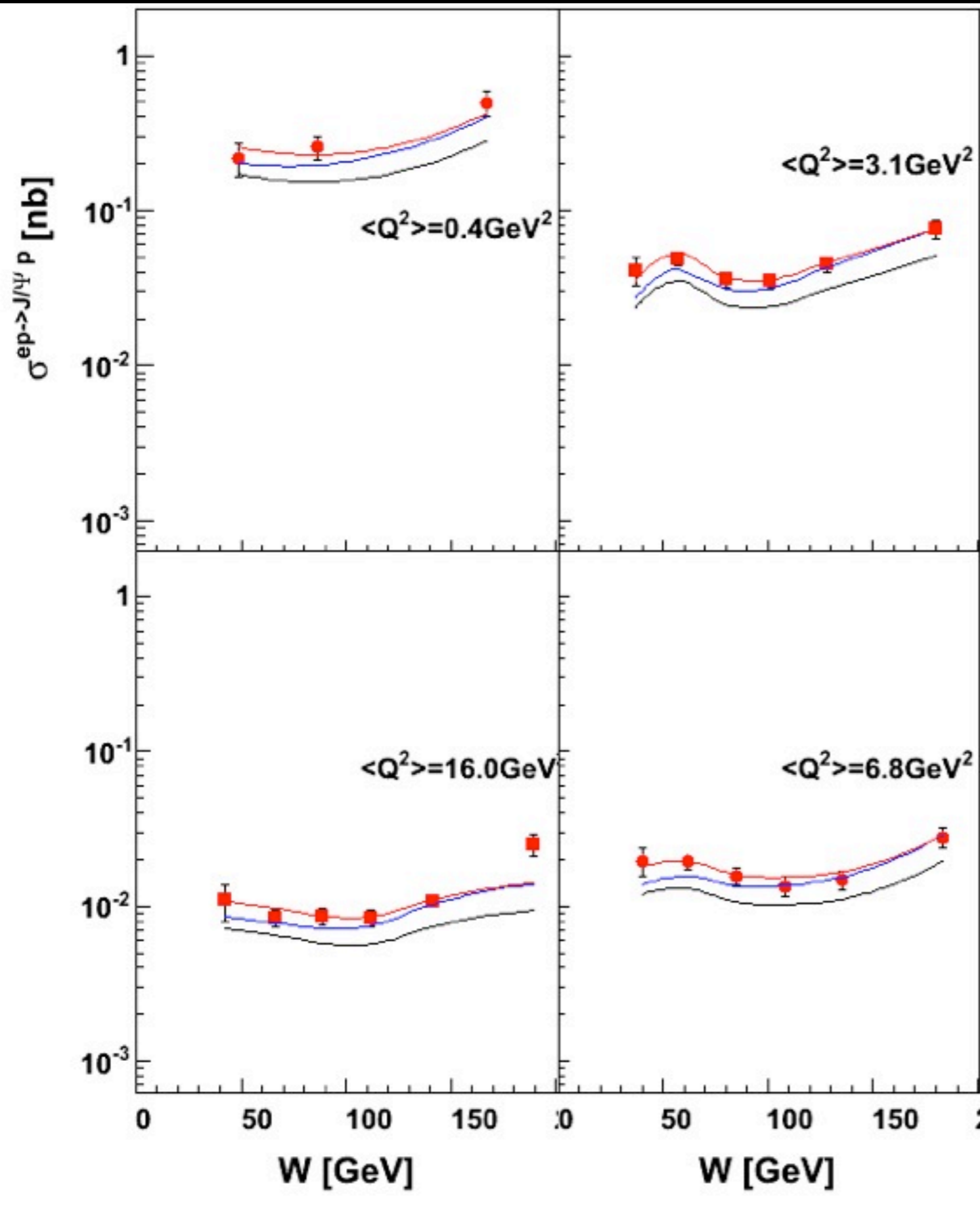
The HERA data was obtained from HEPDATA (Durham) as it was published in:

Exclusive electroproduction of J/Psi mesons at HERA Nuc. Phys. B695

Data listed in Table I in four Q^2 bins $|t| < 1 \text{ GeV}^2$ and several values of W for each bin.

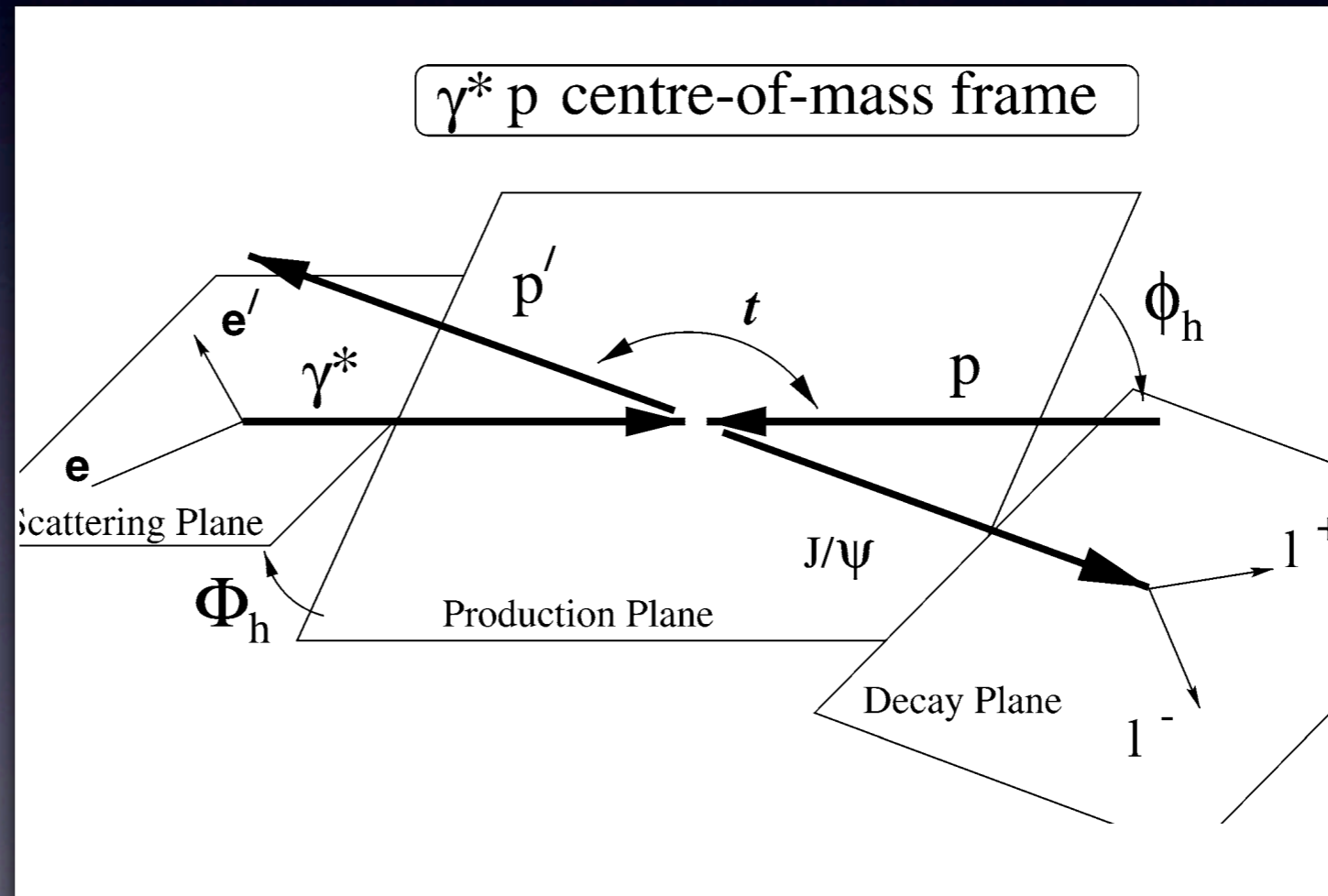
xdvmp produces a cross-section as the result of each setting I identified that cross-section as:

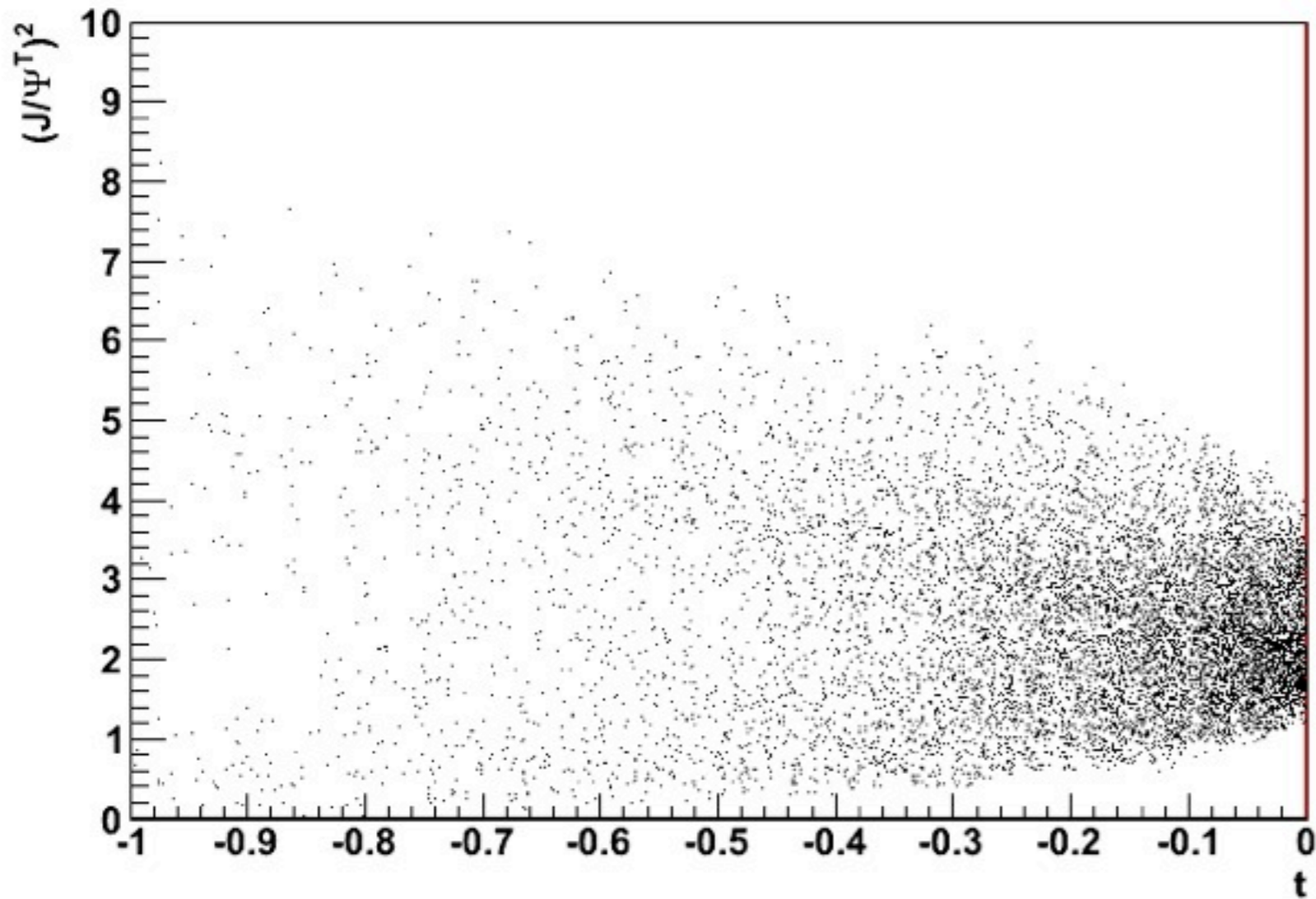
$e+p \rightarrow J/\Psi p$



Black curve: bCGC
 Red curve: bCGCX1.6
 Blue curve: bSat

Test suggested by Henry:
 at small values of t , we should have:
 absolute value of t equal to the square of the Vector
 Meson in the $\gamma^* p$ - Proton in center of mass.





The values of the J/Psi transverse momenta are high and there is no correlation at small values of t .

I have added the final state particle information to the output ntuple as **TLorentzVector**

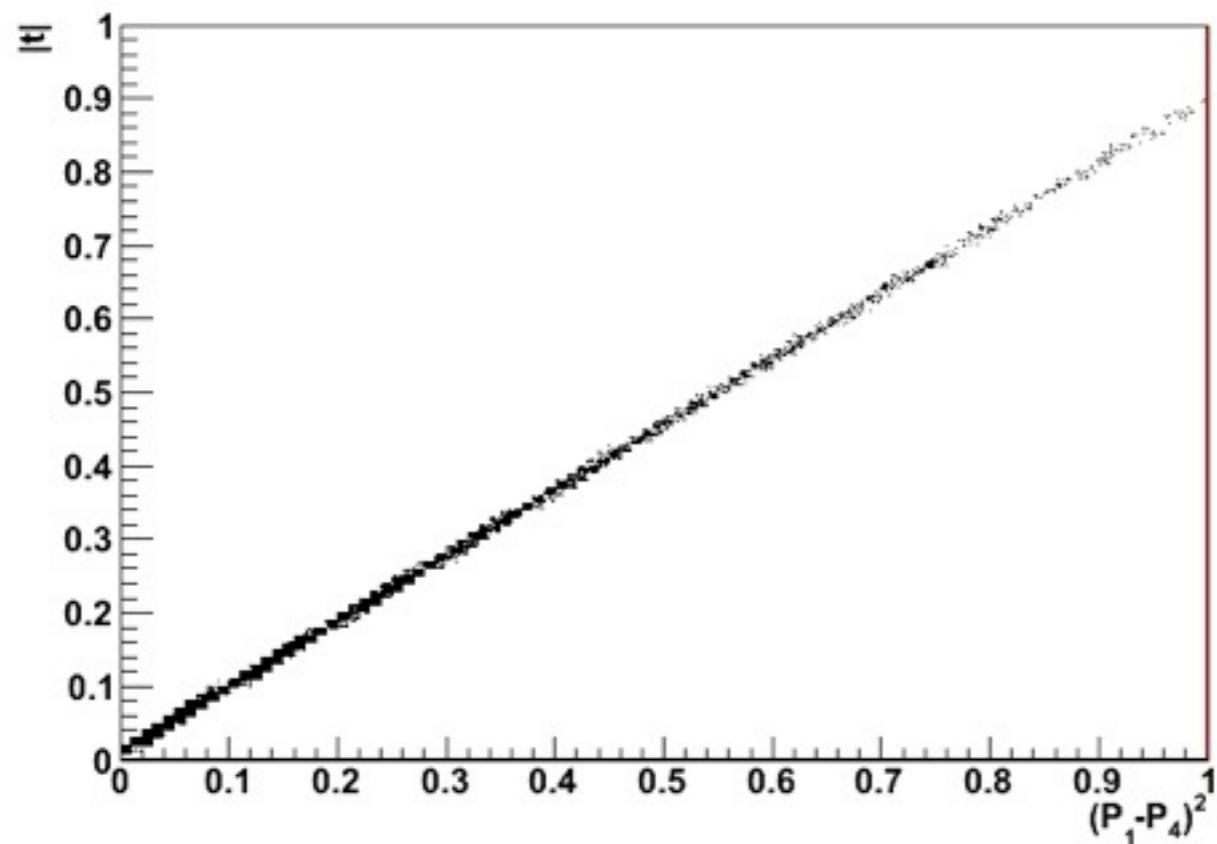
```
tree.Branch("outVectorMeson",
"TLorentzVector", &vmeson, 228000, 0);

tree.Branch("outElectron",
"TLorentzVector", &electronOut, 128000,
0);

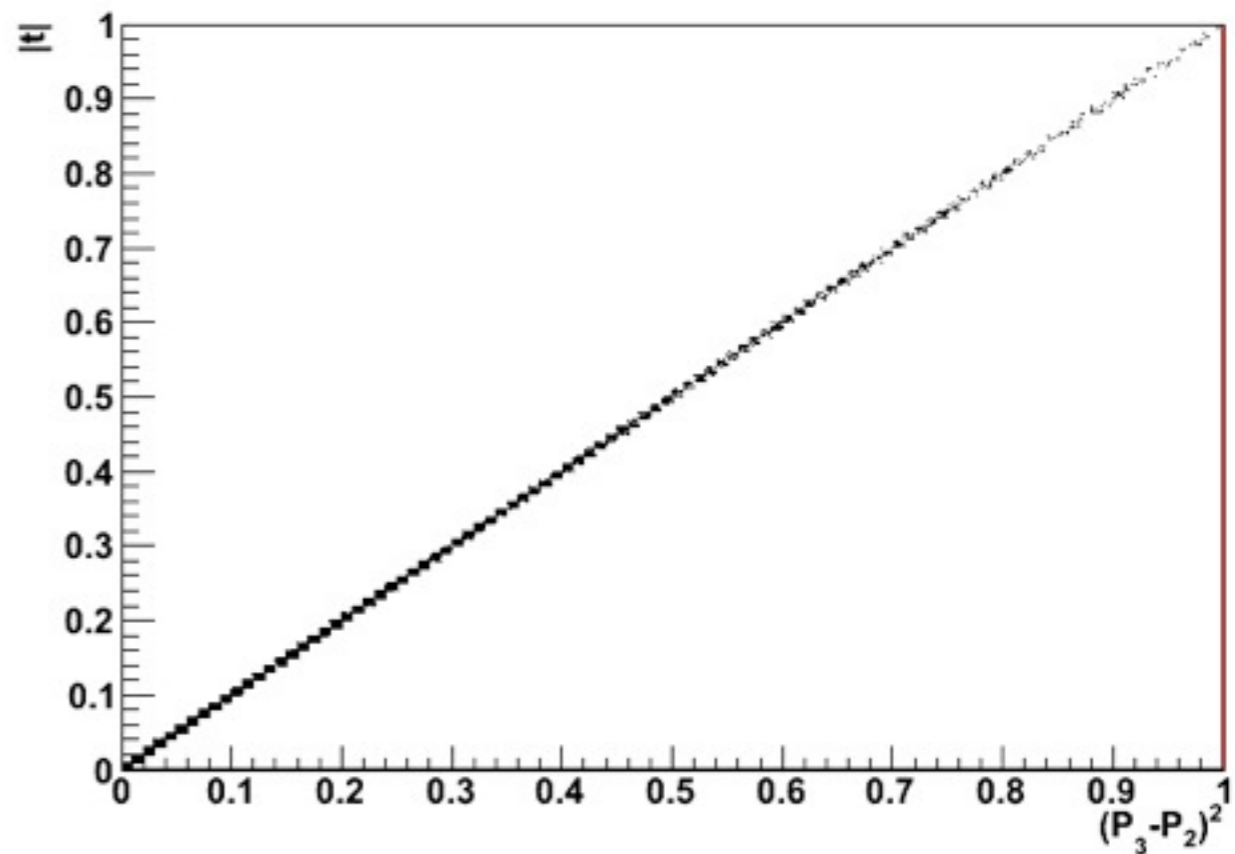
tree.Branch("outProton",
"TLorentzVector", &protonOut, 128000, 0);

tree.Branch("outGammaStar",
"TLorentzVector", &gammaStarOut,
128000, 0);
```

t versus P4-P1 square in gamma proton in frame

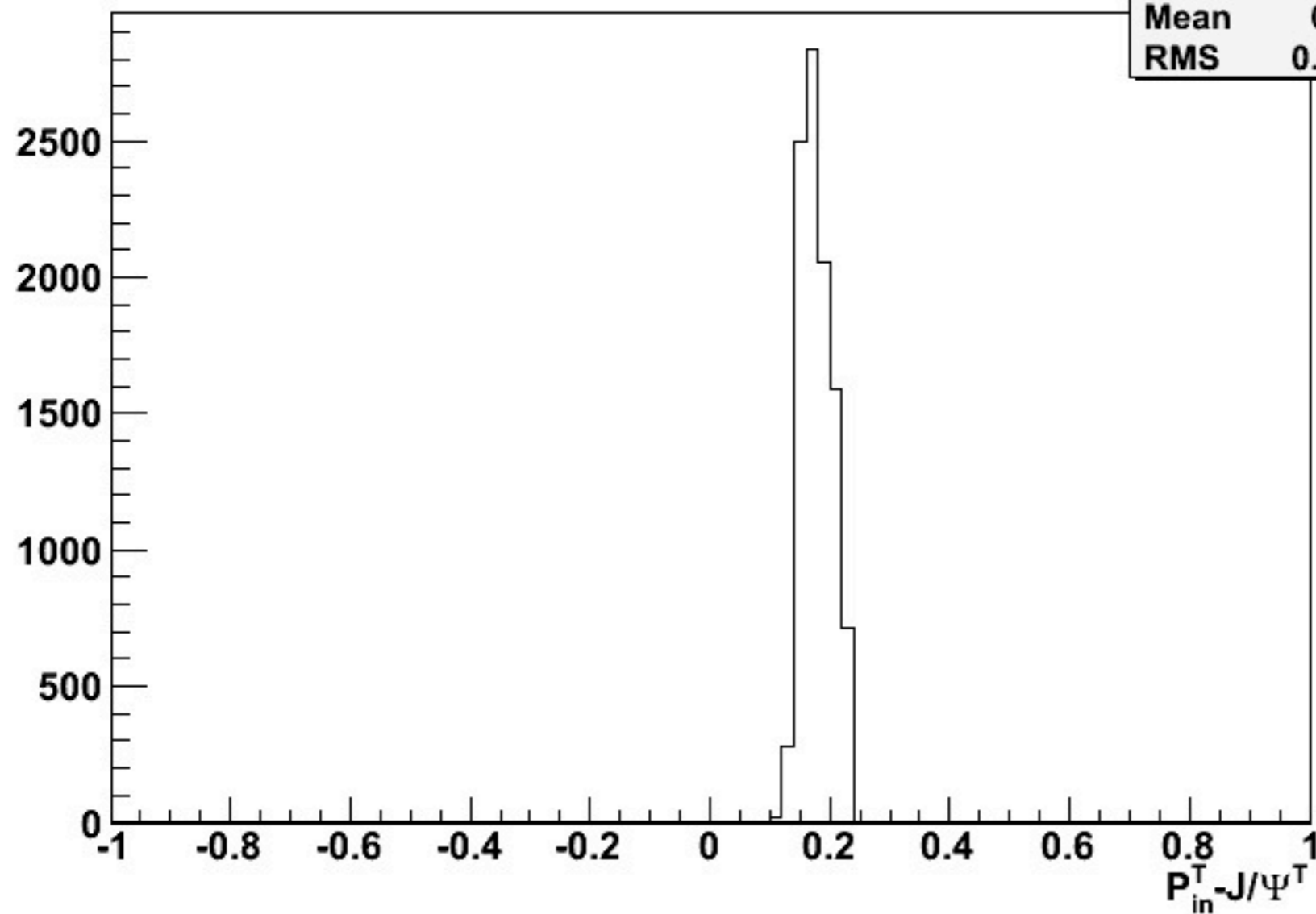


t versus P3-P2 square in gamma proton in frame



pt difference in gammaStar- P_{in} frame

ptDiffProtOutVectorMeson	
Entries	10000
Mean	0.1785
RMS	0.02533



To do:

Thomas has already checked that he can recalculate Q_2, W, t from the final state variables, I will repeat that test.

Check that energy is conserved.