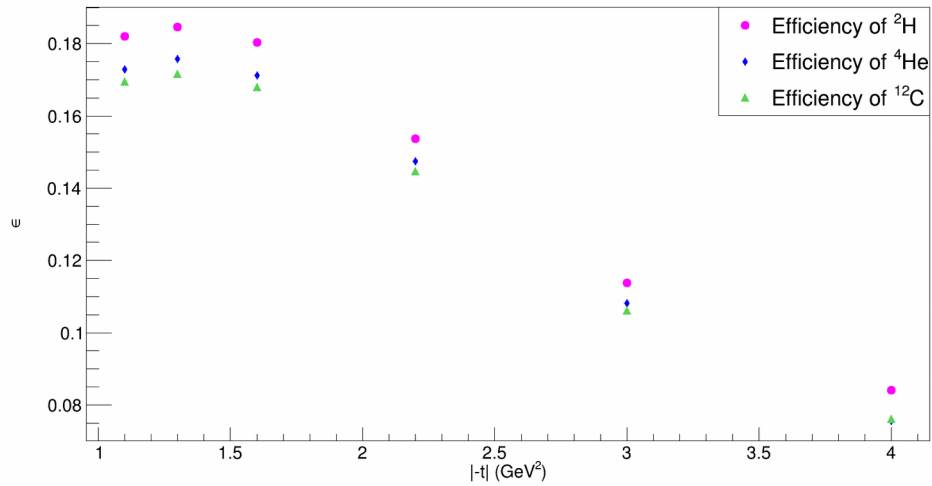
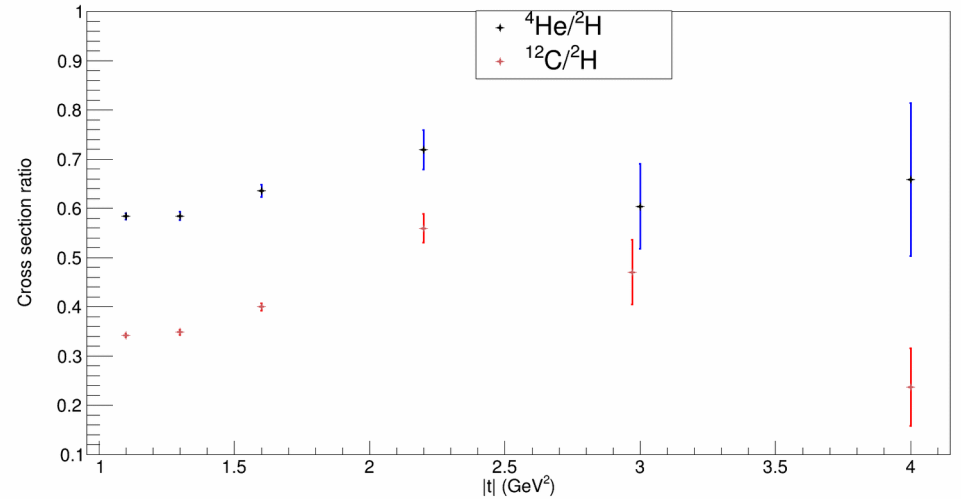

Understanding the Background Shape under the ρ^0 Signal

Preliminary Results

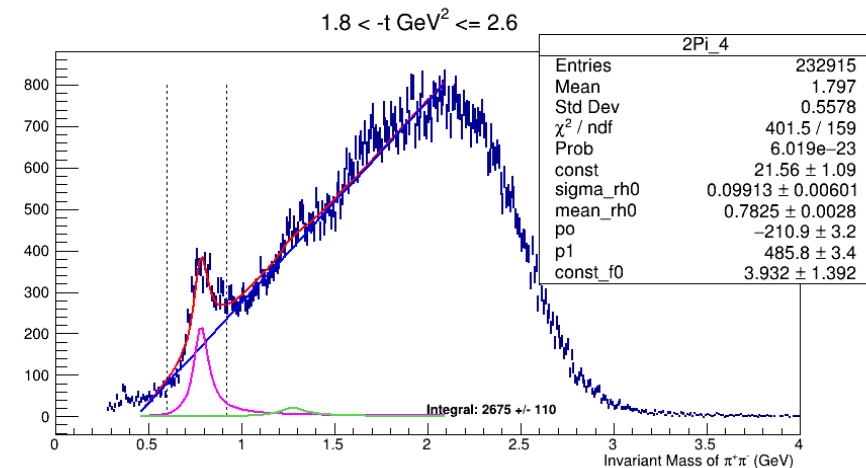
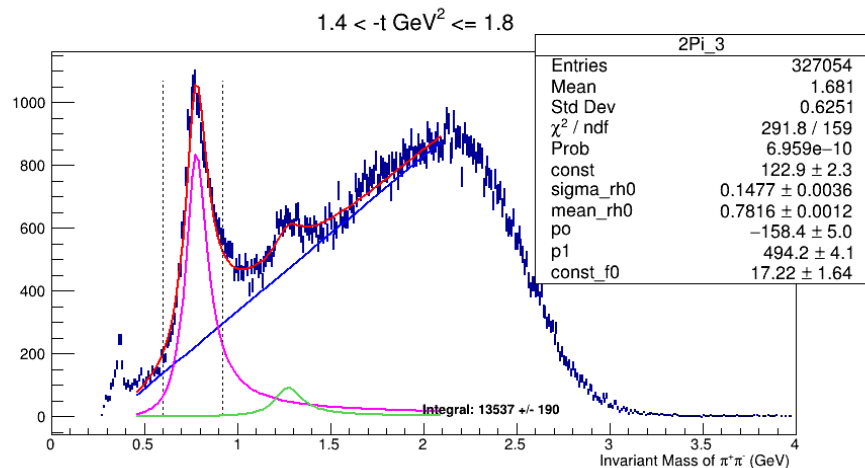
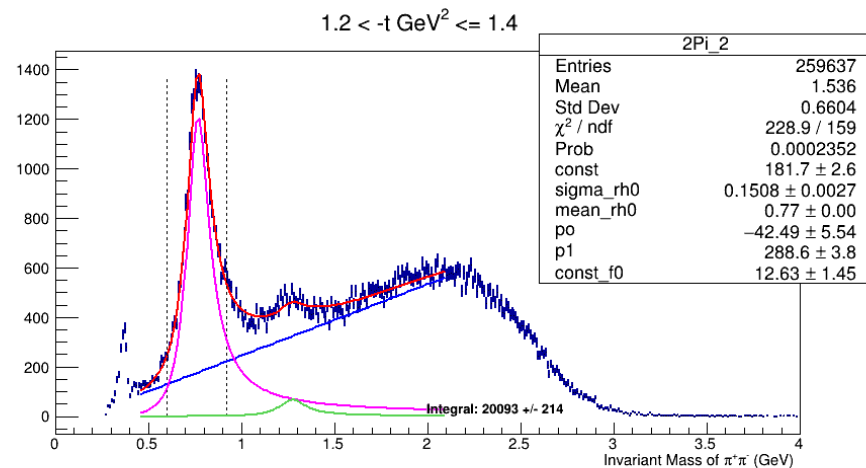
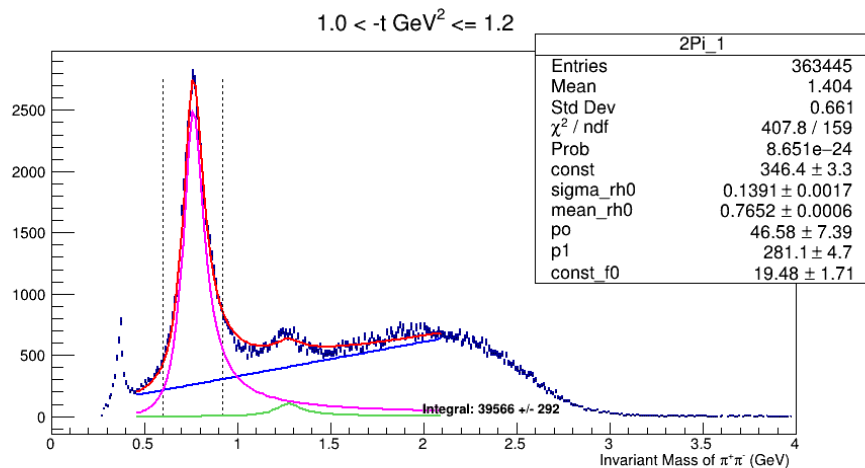
Efficiency



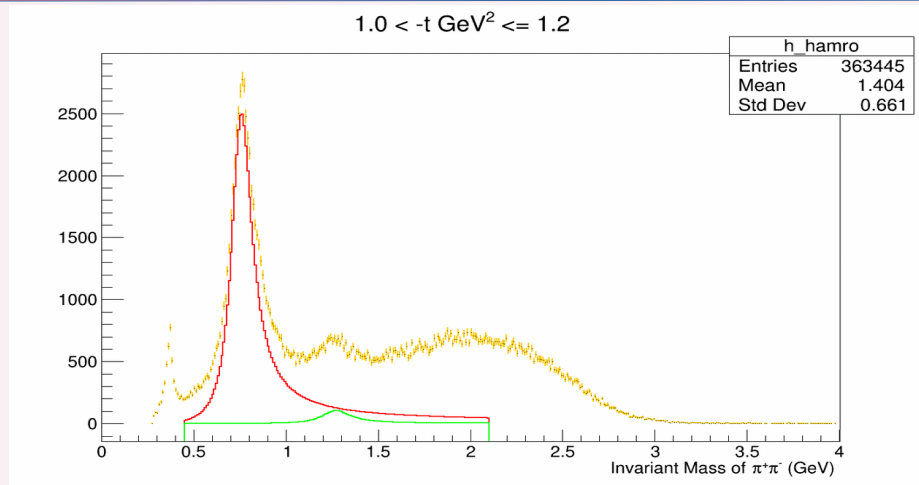
Transparency



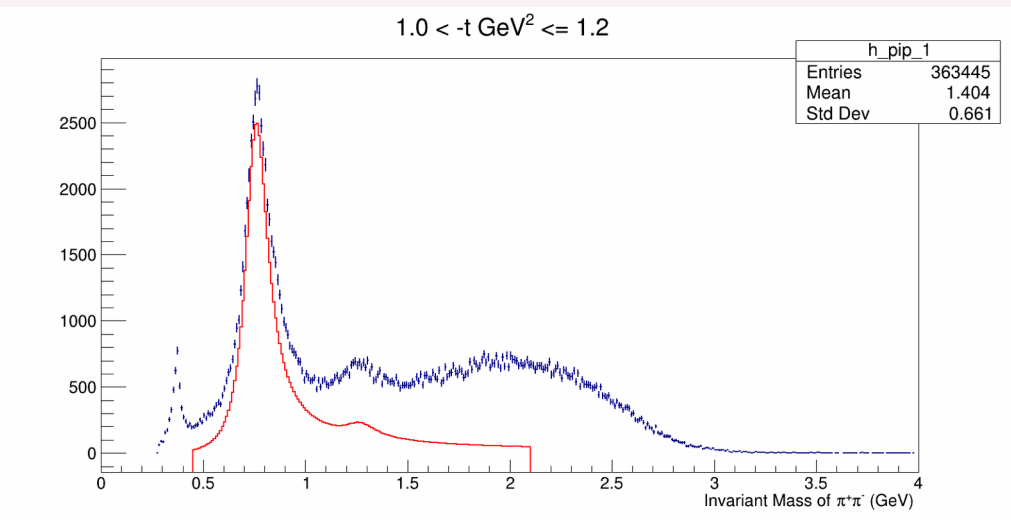
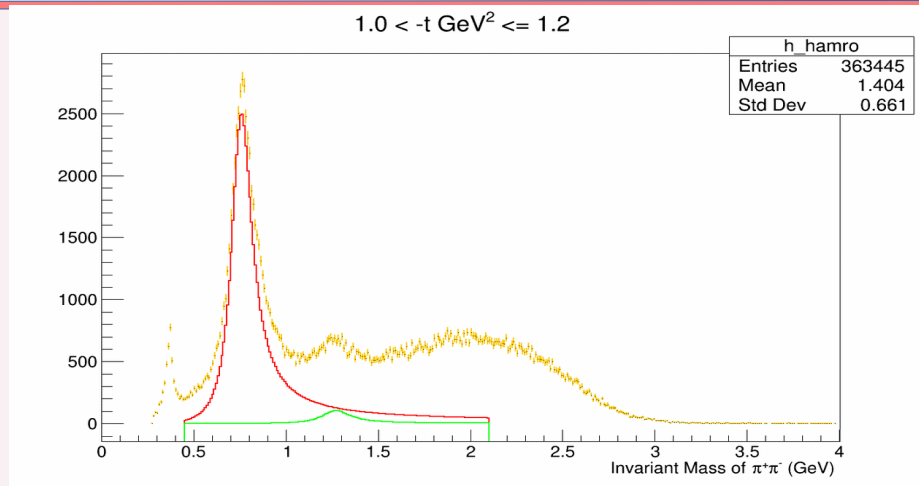
Background Shape.



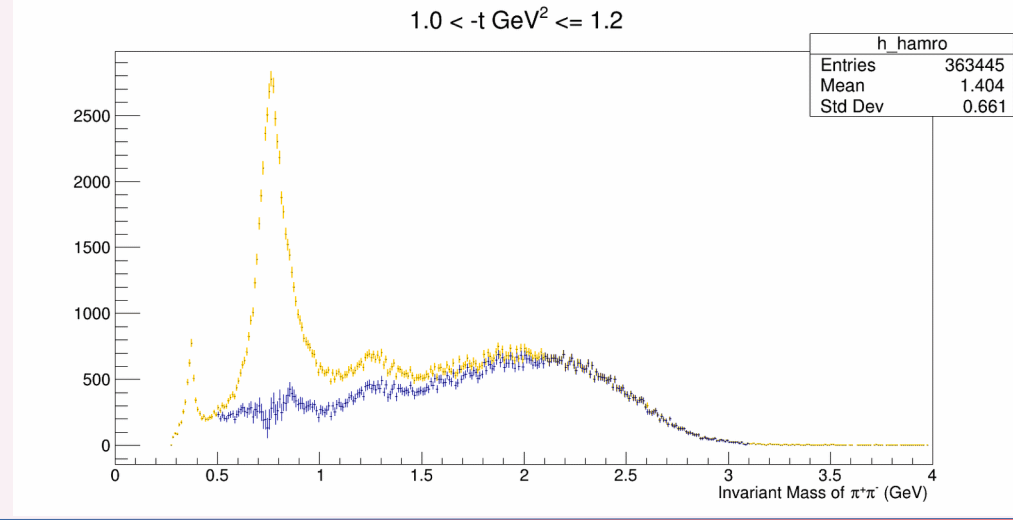
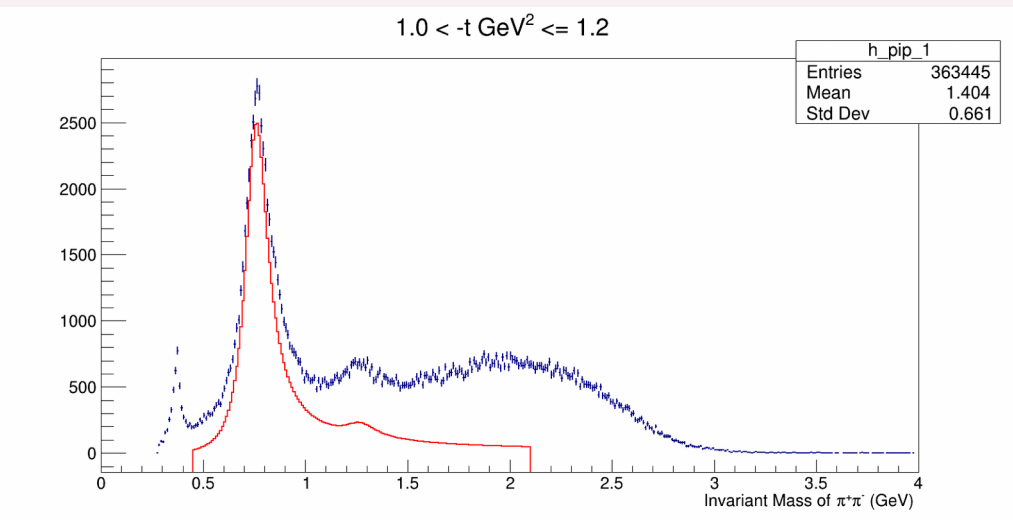
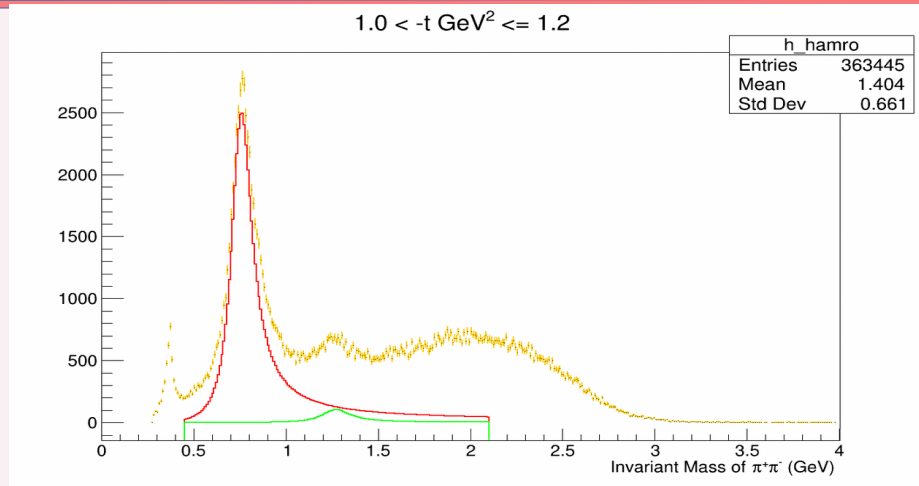
BW functions



Sum of BW functions

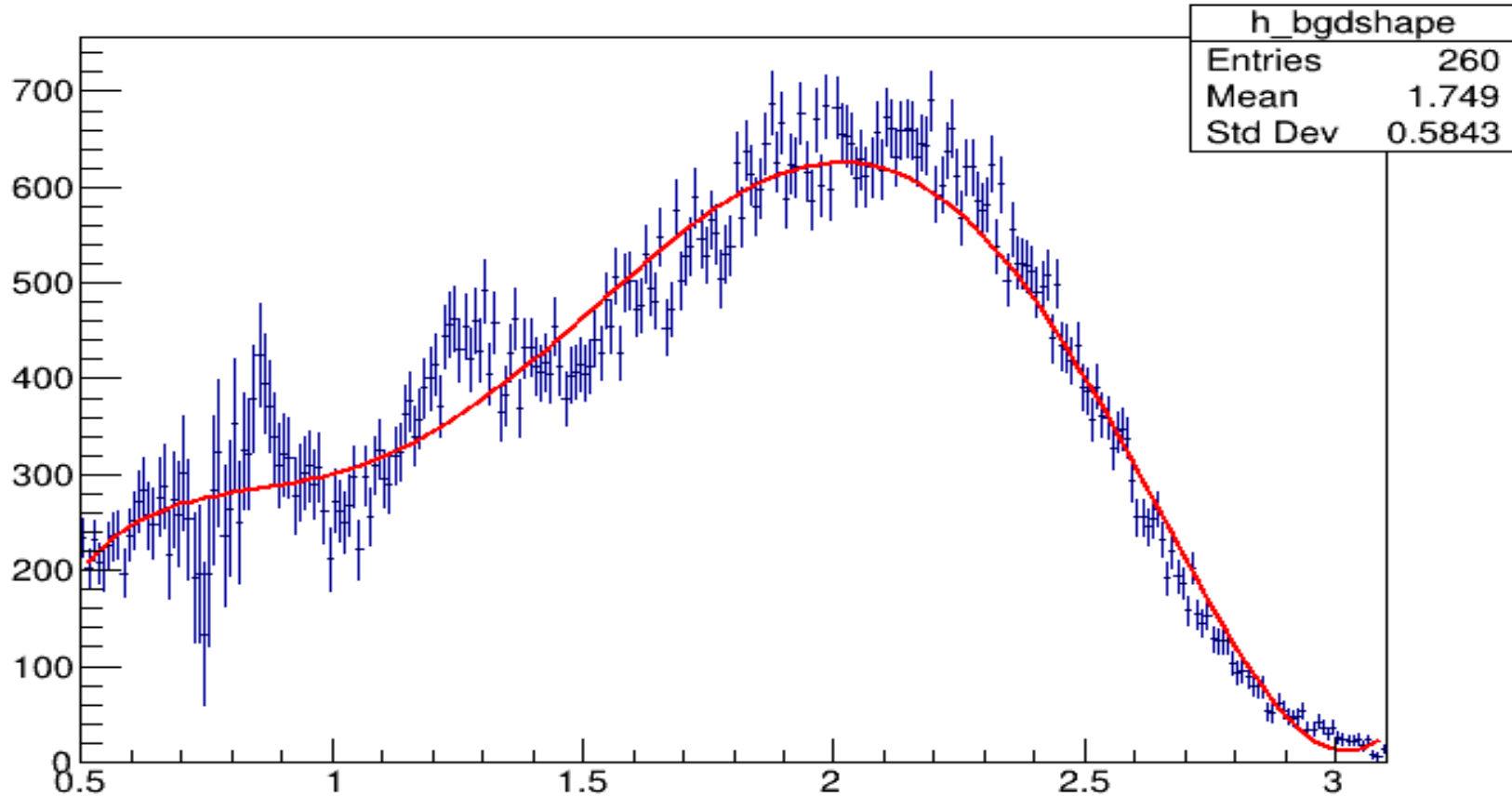


Subtraction of BW functions from Data

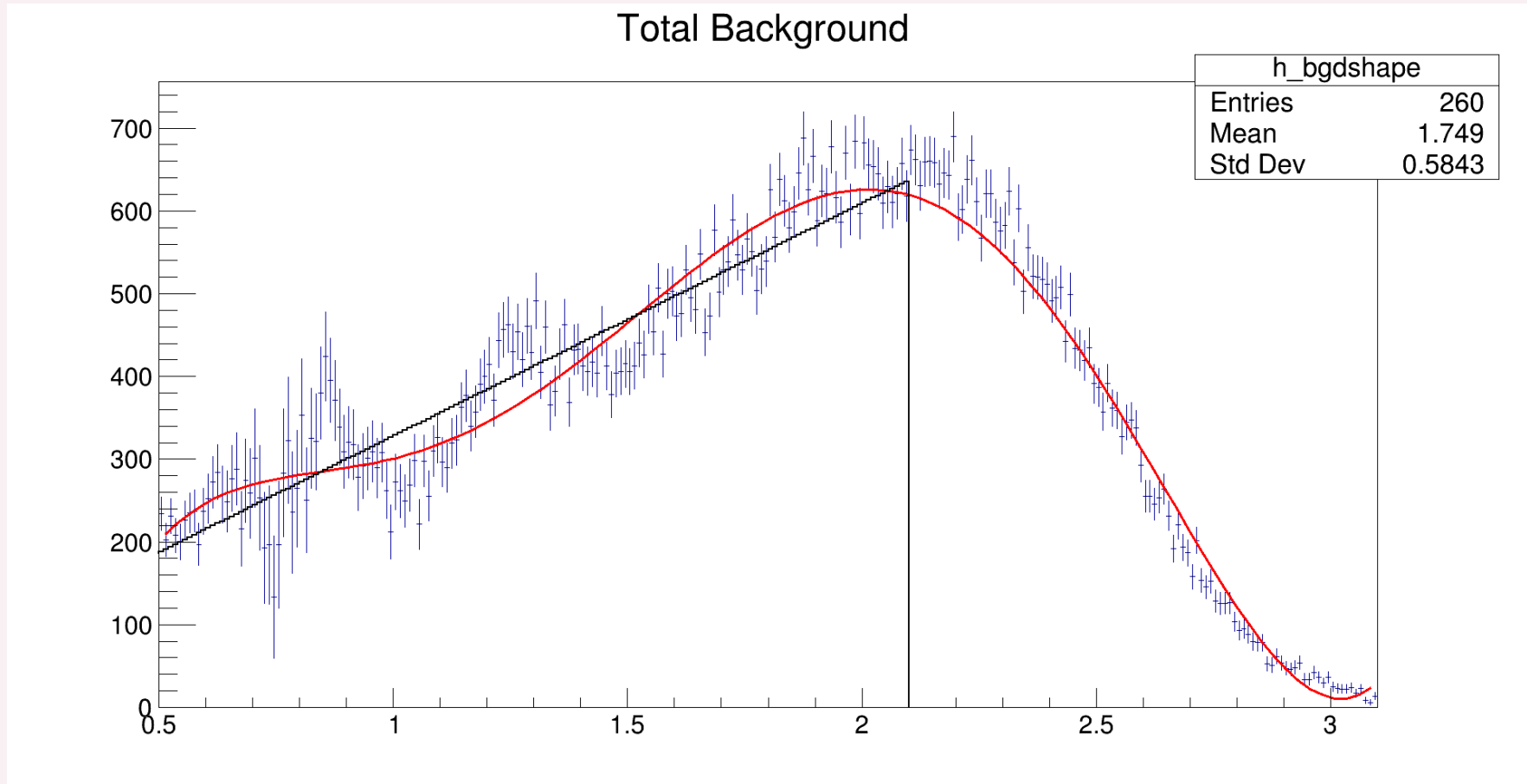


Fitting the subtracted data by 5th order polynomial

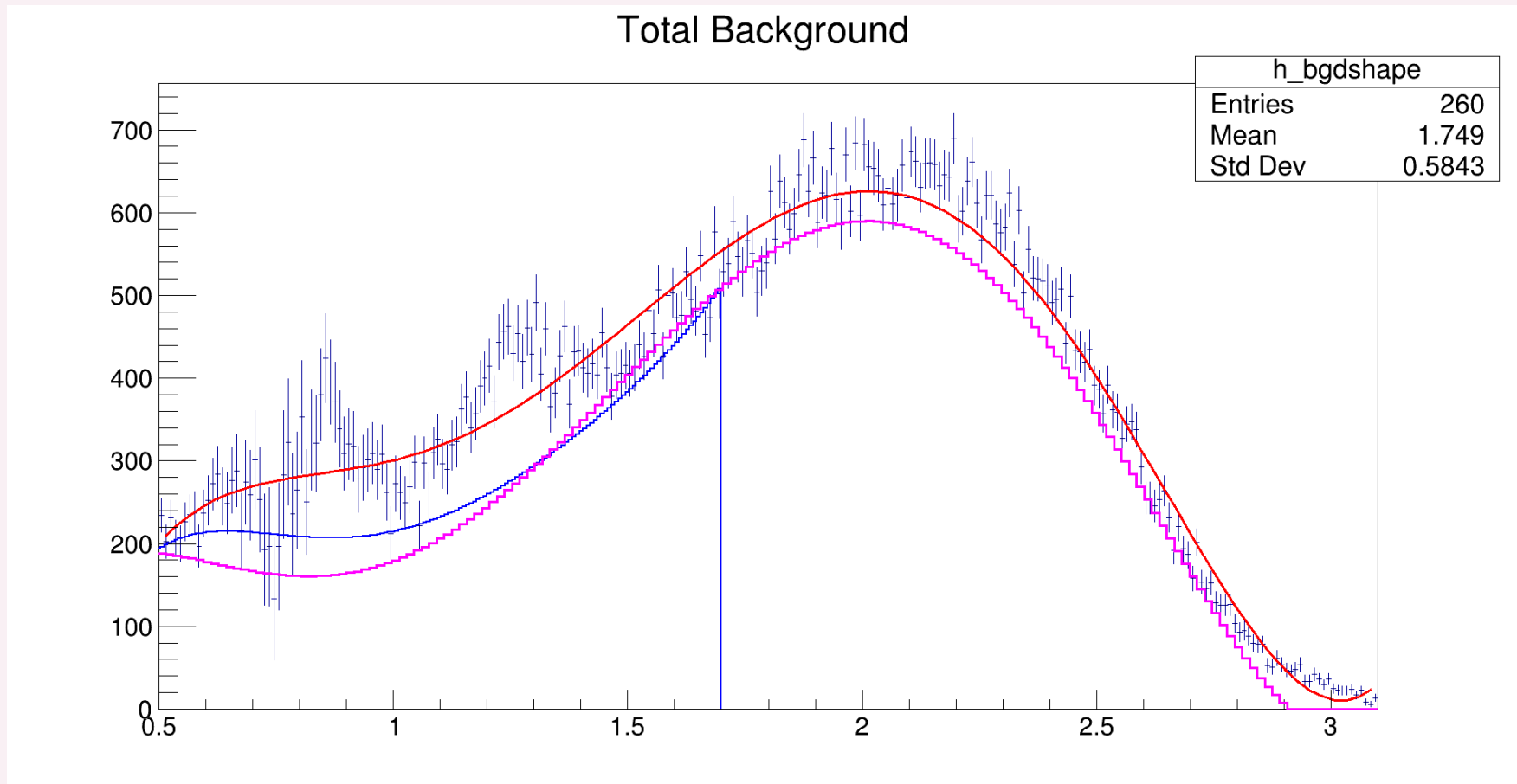
Total Background



Comparing Bgd with first order polynomial

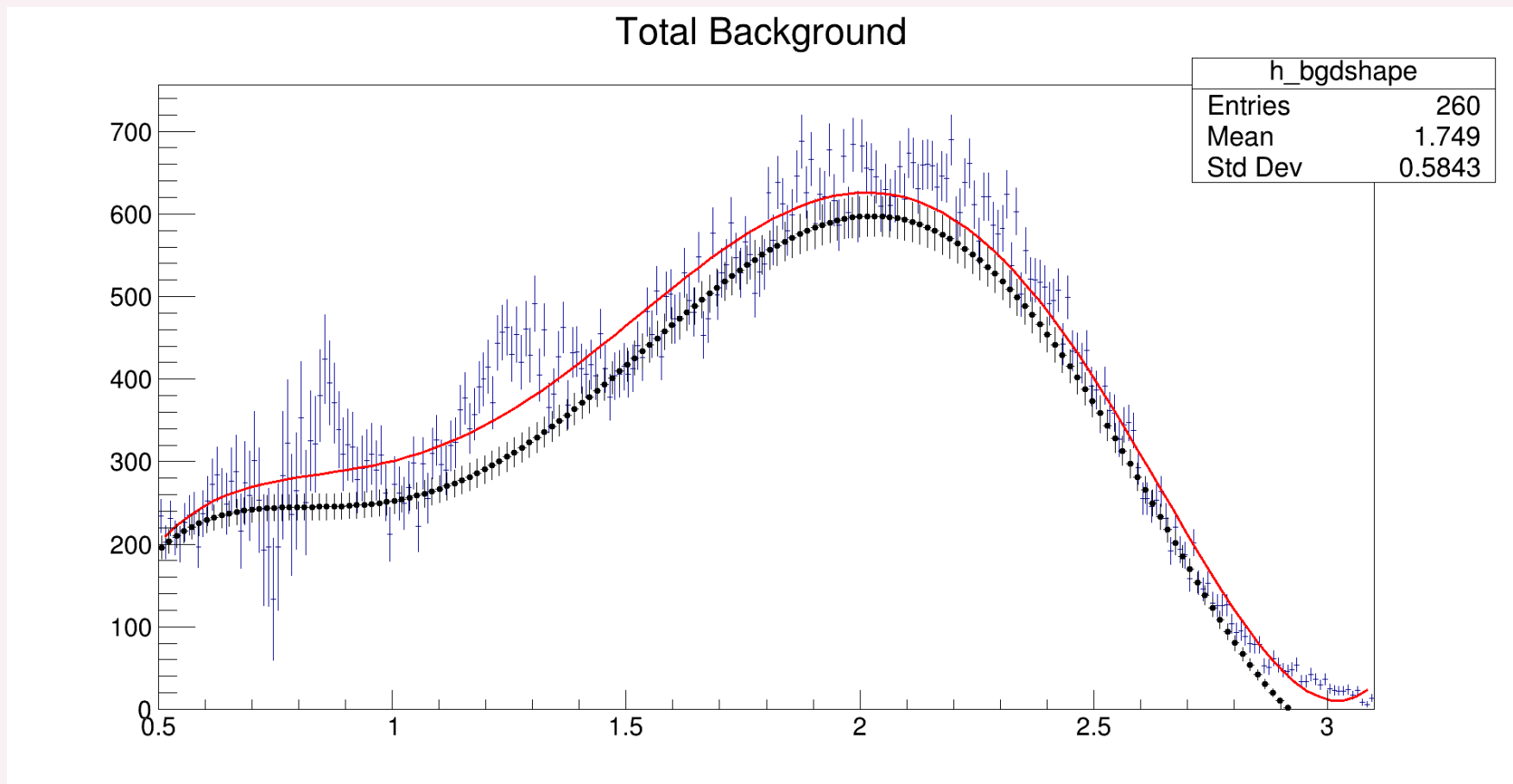


Comparing Bgd with 5th order polynomial.



Background parameters are floated

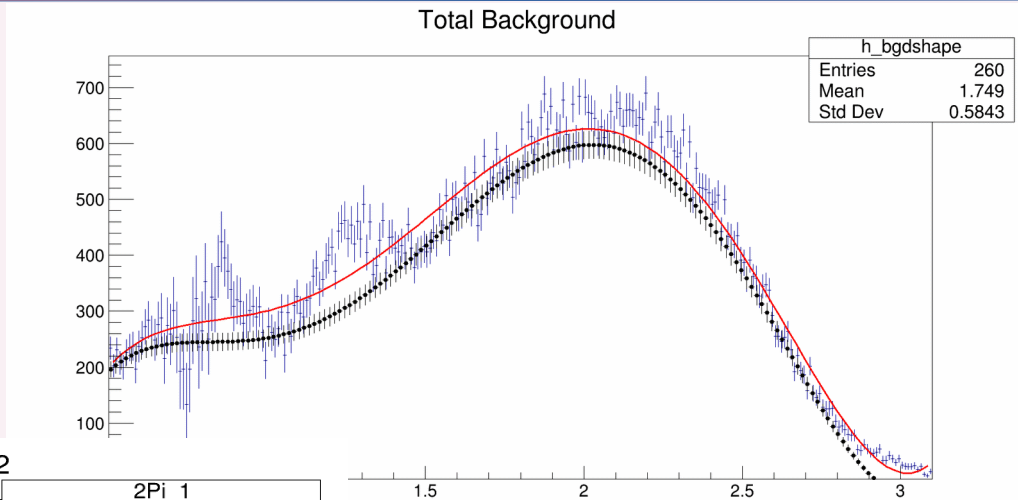
Comparing Background



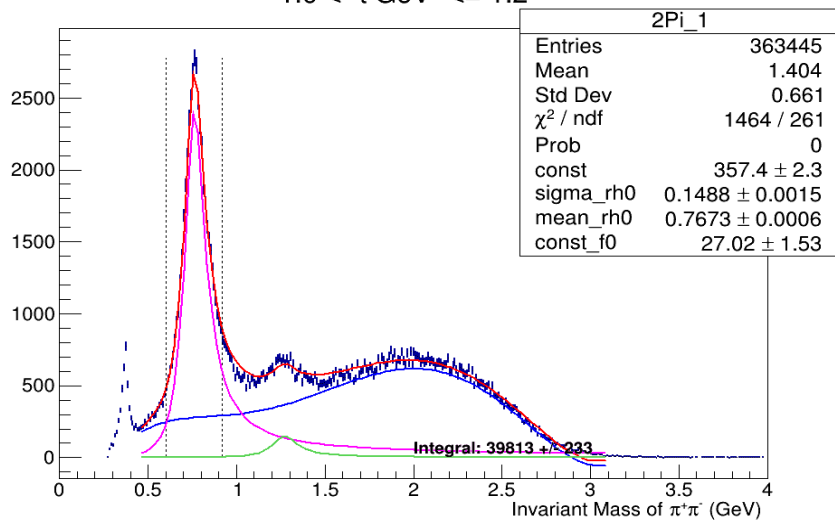
Floating all parameters vs only p0 parameter

Invariant Mass \rightarrow All Bgd Parameters fixed.

Bgd Parameters Fixed

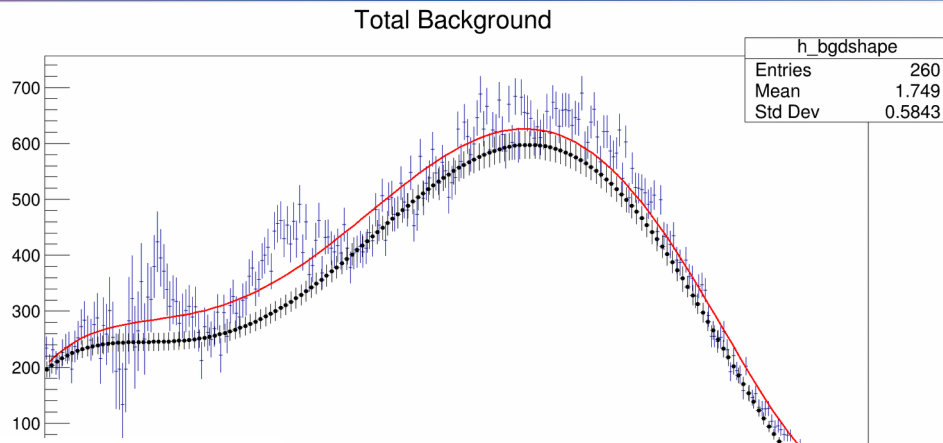


$1.0 < -t \text{ GeV}^2 \leq 1.2$



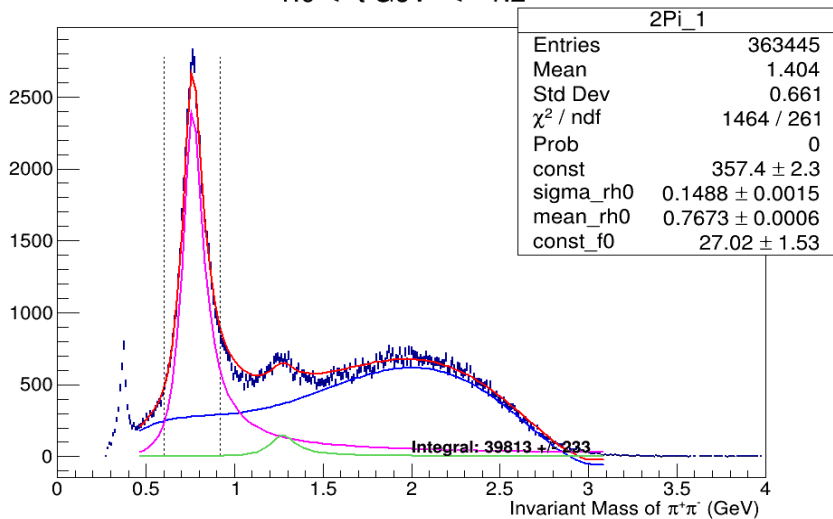
Invariant Mass \rightarrow All Parameters fixed/P0 fixed.

Bgd Parameters Fixed



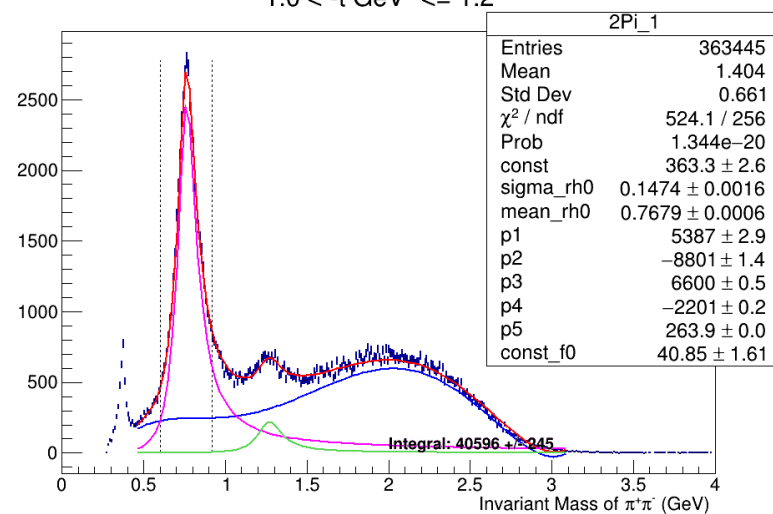
Only P0 Fixed

$1.0 < -t \text{ GeV}^2 \leq 1.2$

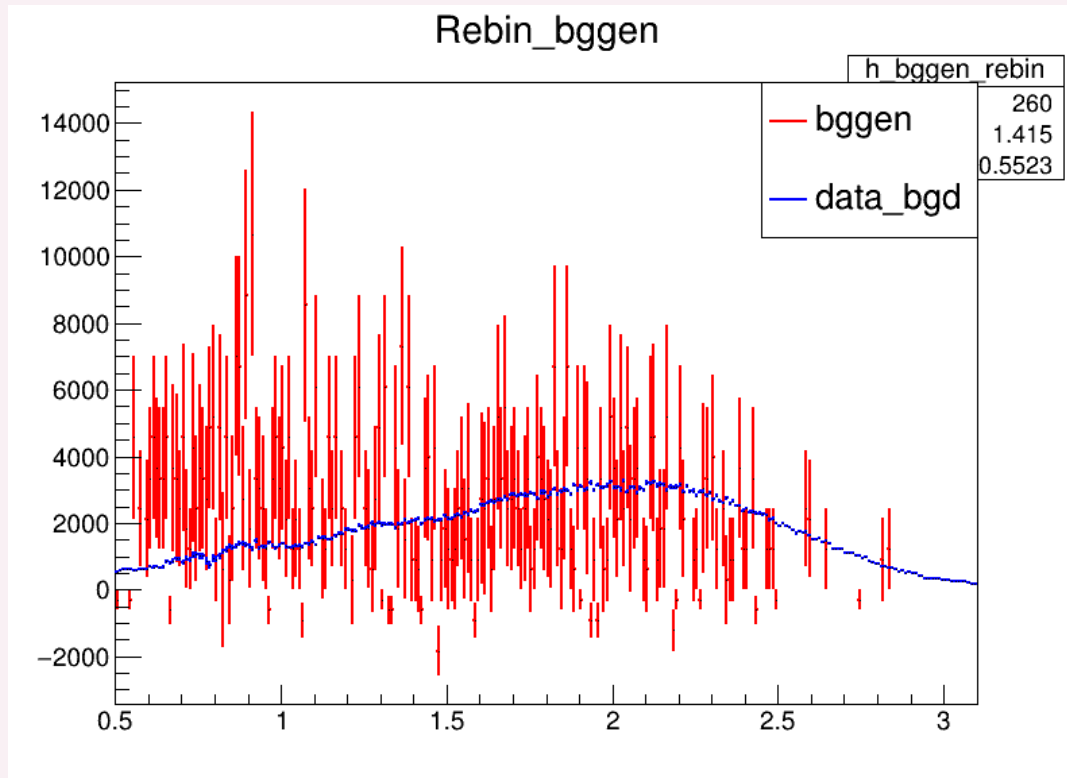


1.5 2

$1.0 < -t \text{ GeV}^2 \leq 1.2$



Comparison of Bggen vs Data



$|t| > 1$ vs $1.0 < |t| < 1.2$

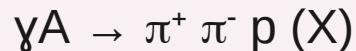
Summary

- For the range $1.0 < |t| \text{ GeV}^2 < 1.2$, a fifth-order polynomial with a fixed constant p_0 explains the background shape.
- Test this for different targets and check if the same p_0 works across them.
- Test this for different bins in $|t|$ and determine the best order polynomial.
- The low statistics of Bggen events did not help in understanding the background mostly at high $|t|$.

Backup

Event Selection

Reaction Filter Stage



Flags: Vertex and Momentum constrained, 4 beam bunches on each sides of prompt peak, 2 Extra tracks and 5 extra shower: **B4F4T2S5**

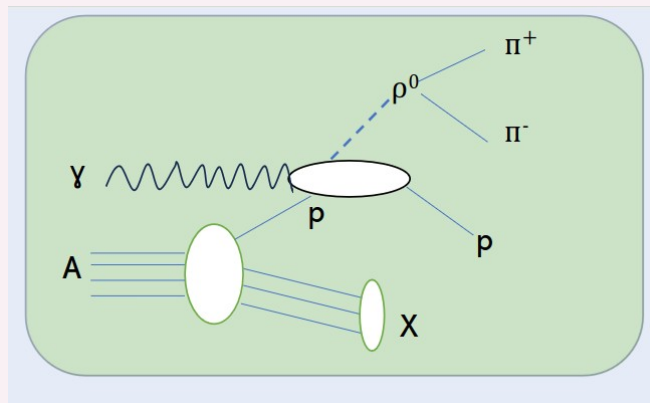
DSelector Stage

Loose cuts

CL > 0.0001 , beam energy > 6.0 GeV, Extra tracks = 0, Missing Momentum < 350 MeV , 2 accidental peak on each side of prompt peak.

> Base Criteria

- > Confidence Level > 0.001
- > Beam Energy [6.5,10.8 GeV]
- > Extra Tracks = 0
- > Numbers of Shower = 5
- > Proton Vertex [52,78] cm
- > Missing Momentum < 300 MeV/c

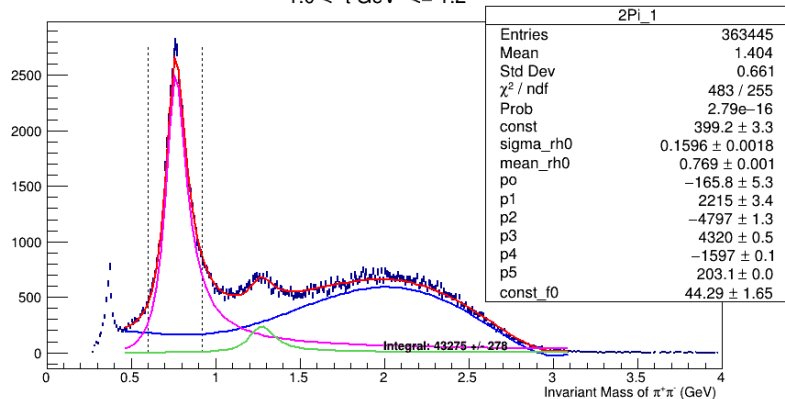


t_min	t_max	Proton angle
1	1.2	> 25 degree
1.2	1.4	> 25 degree
1.4	1.8	> 25 degree
1.8	2.6	> 25 degree
2.6	3.4	> 25 degree
3.4	4.6	> 20 degree

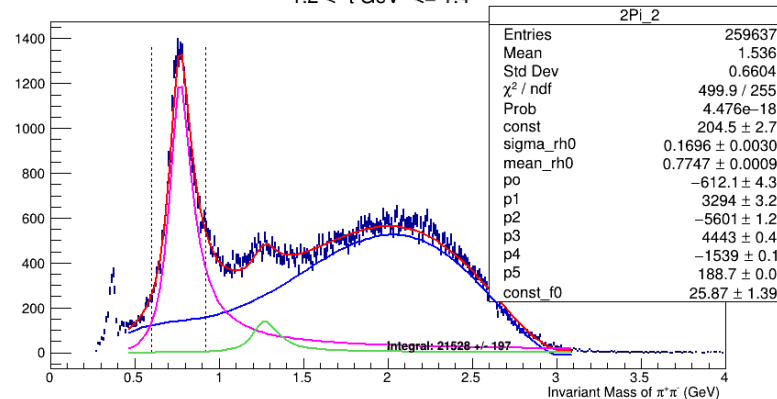
Selection cuts have been applied consistently to both data and reconstructed simulations.

5th order Polynomial with float parameters

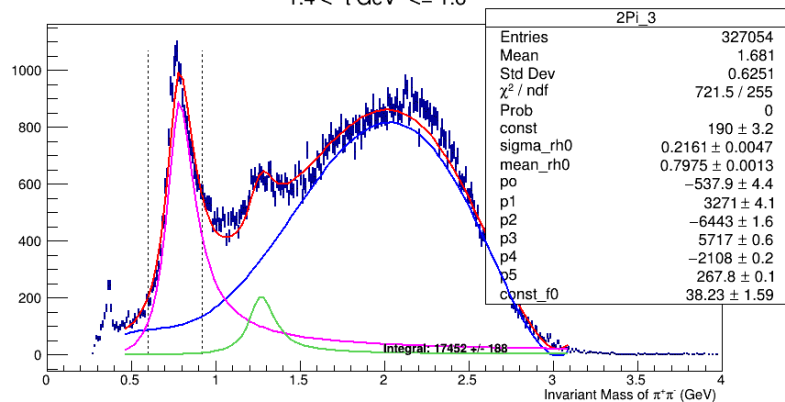
1.0 < -t GeV² <= 1.2



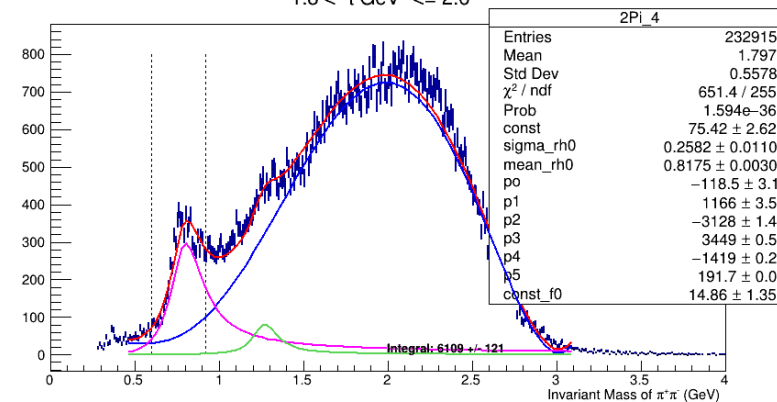
1.2 < -t GeV² <= 1.4



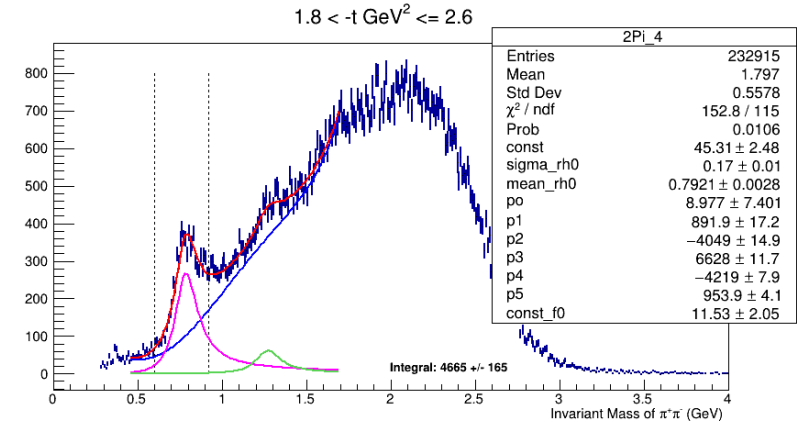
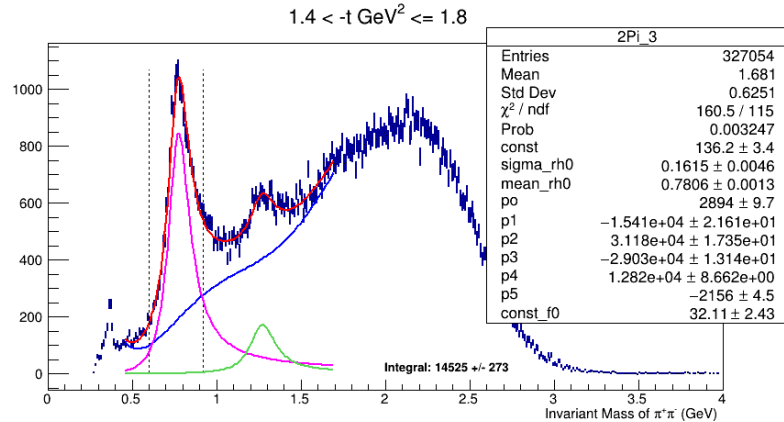
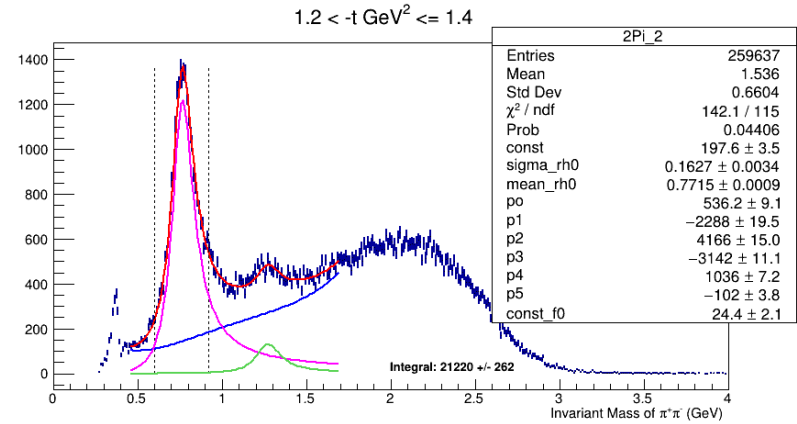
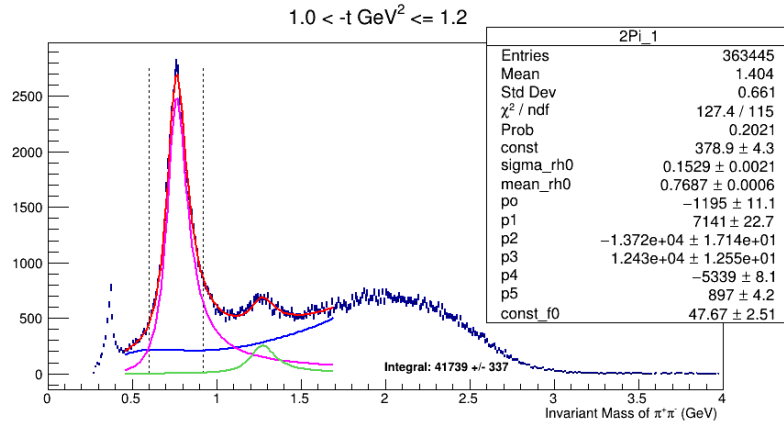
1.4 < -t GeV² <= 1.8

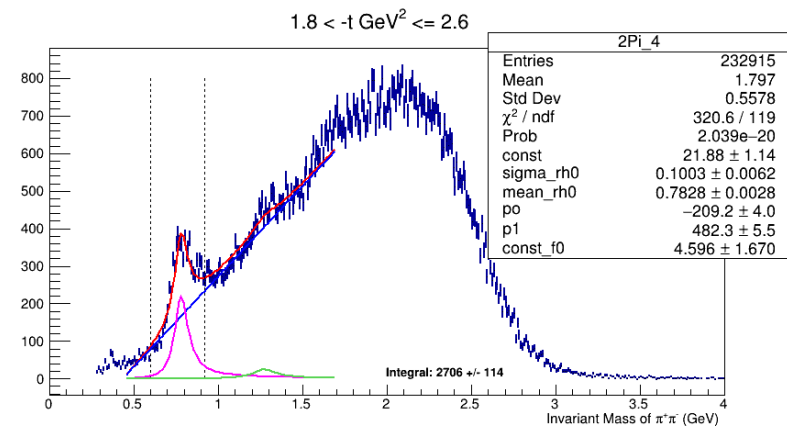
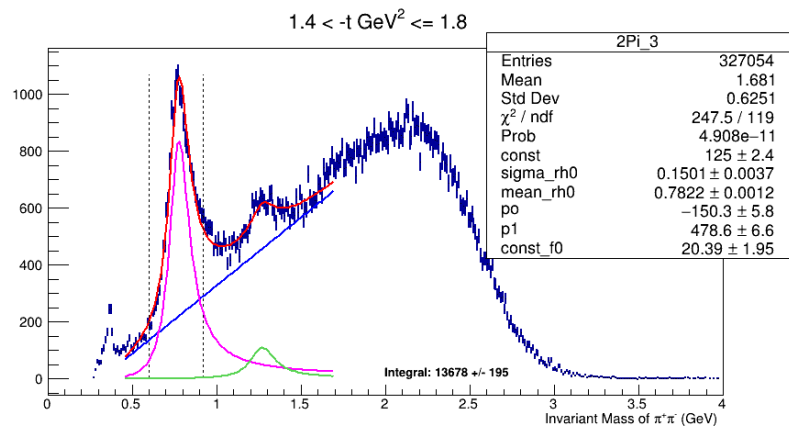
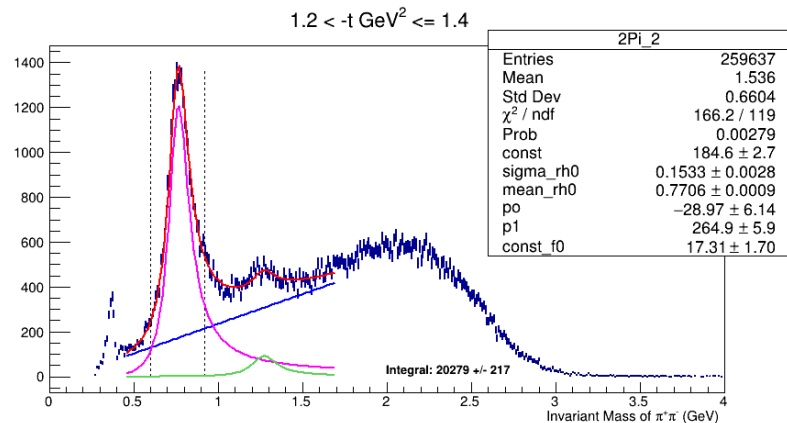
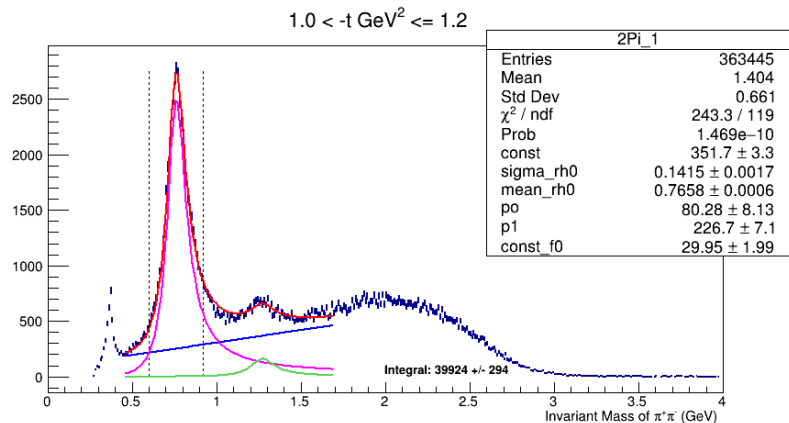


1.8 < -t GeV² <= 2.6

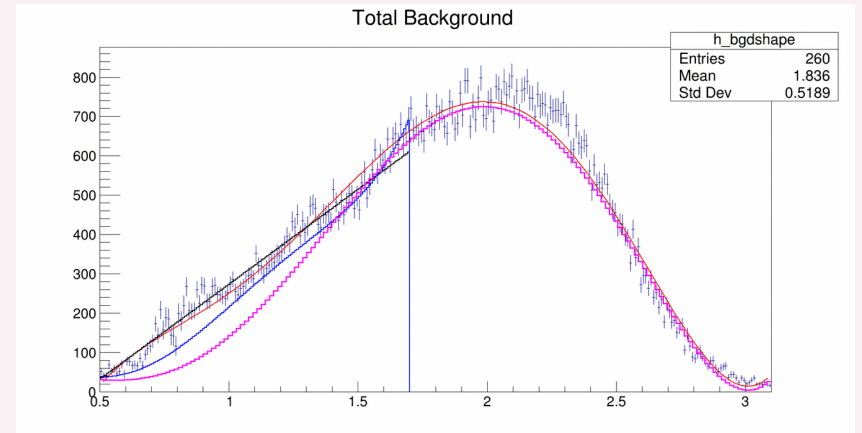
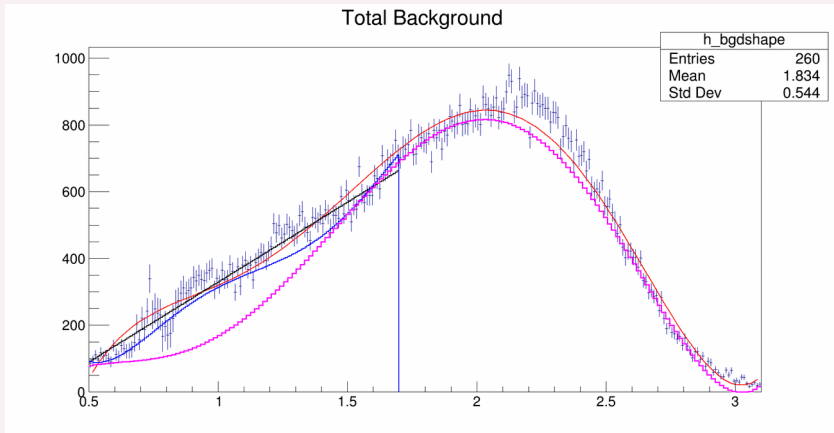
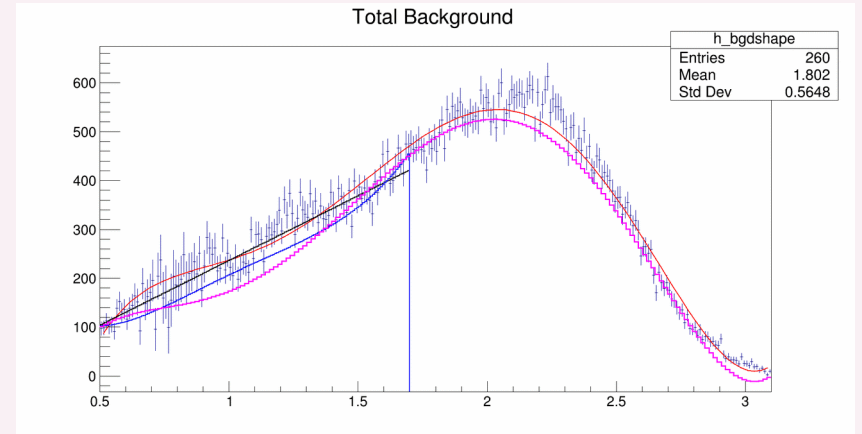
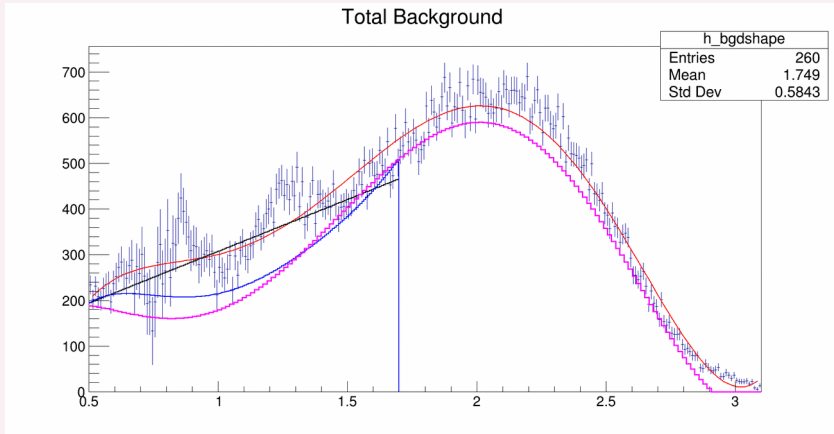


Backup

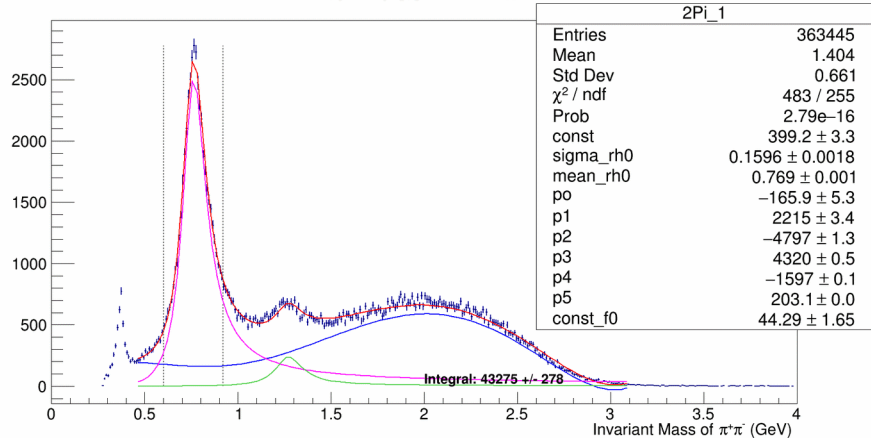




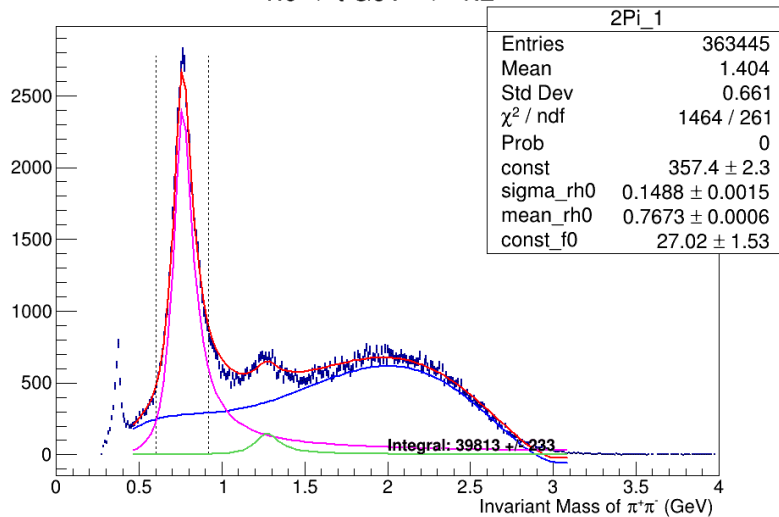
Floating the Parameter.



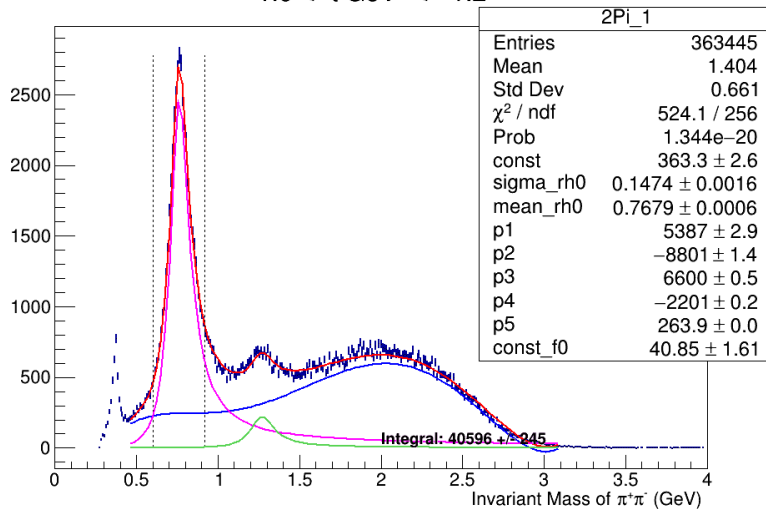
$1.0 < -t \text{ GeV}^2 \leq 1.2$



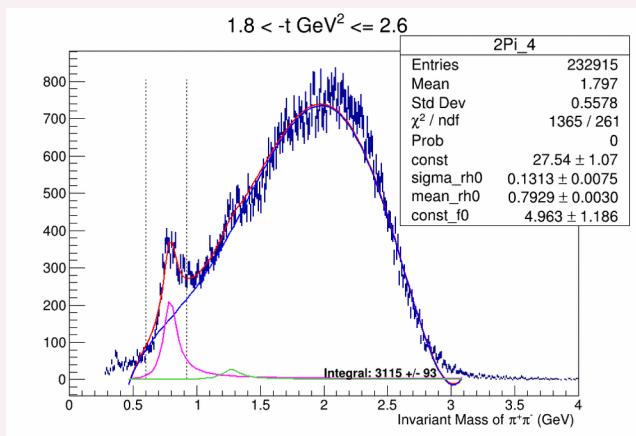
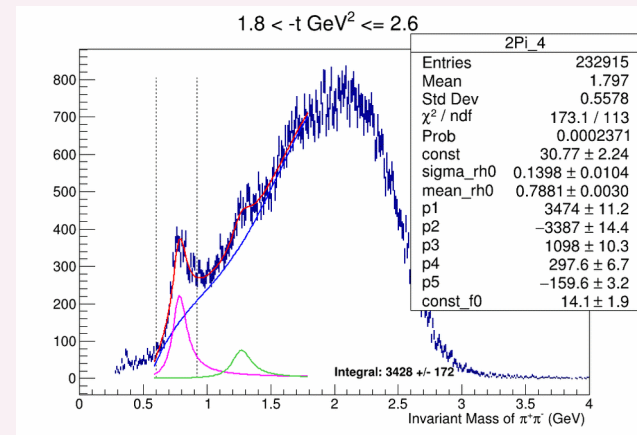
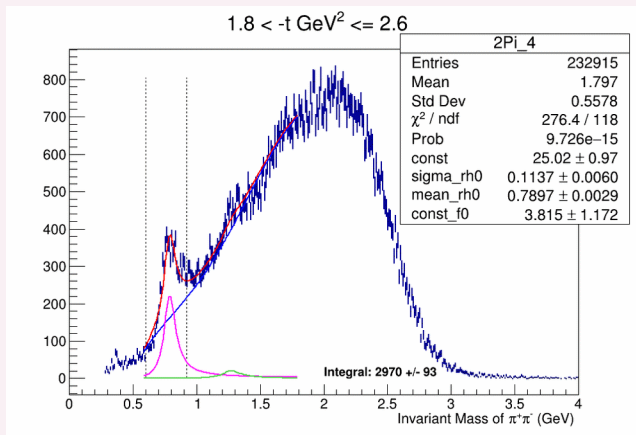
$1.0 < -t \text{ GeV}^2 \leq 1.2$



$1.0 < -t \text{ GeV}^2 \leq 1.2$

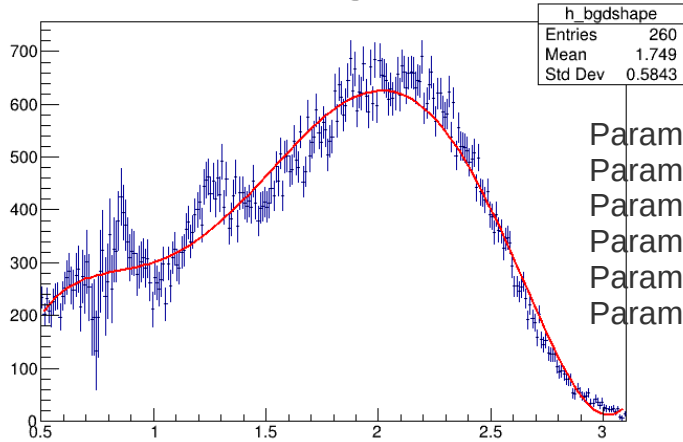


Only P0
fixed



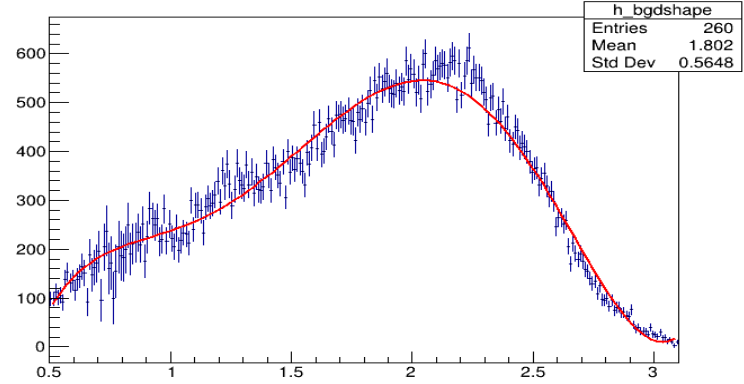
Background Shape of Data

Total Background

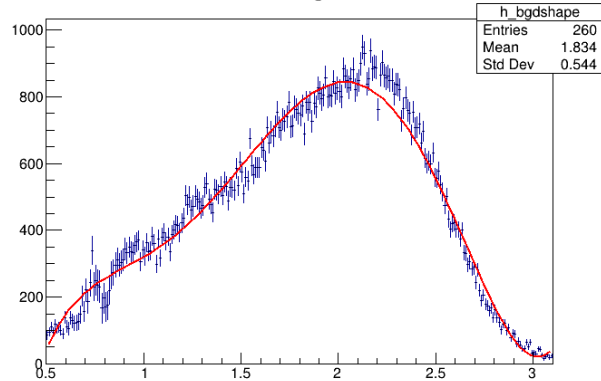


Parameter 0: -996.899
Parameter 1: 5253.92
Parameter 2: -8309.85
Parameter 3: 6151.61
Parameter 4: -2042.27
Parameter 5: 244.304

Total Background



Total Background



Total Background

