### List of things this talk will discuss:

- QValue Study Fitting: Phi (w/ 1k NN)
- QValue Study Fitting: Phi (w/ 2k NN)
- QValue Study Fitting: Phi (w/ 4k NN)
- QValue Study Fitting: Phi (w/ 3k NN)
- QValue Study Fitting: Phi and Eta (w/ 3k NN)
- Table of Results and Calculations

### My Qvalue Study:

- I tried the study again, only this time I am using the event driven analysis rather than a combo driven analysis
- I am fitting both the phi and eta peaks for each event, then taking the Qvalue from each fit and combining them together to get a final Qvalue = Qval\_phi\*Qval\_eta
- The kinematic distance variables I am using are:
  - K+, cosine and phi in Helicity Frame
  - Photon from Eta, cosine and phi in Helicity Frame
  - Phi Meson, phi and cos in GJ Frame
  - Beam Energy
  - t
  - Missing Energy
  - Missing Mass Squared
- I am using the 3k nearest neighbors
- I only studied the first 5k events because it takes ~5hrs to run the code
- Therefore, it will take  $\sim$ 5.5 days to run over all of the data

#### Qvalue Study Fitting: Phi (w/ 1k NN)



#### Qvalue Study Fitting: Phi (w/ 1k NN)









#### Qvalue Study Fitting: Phi (w/ 1k NN)









#### Qvalue Study Fitting: Phi (w/ 2k NN)



#### Qvalue Study Fitting: Phi (w/ 2k NN)









#### Qvalue Study Fitting: Phi (w/ 2k NN)









#### Qvalue Study Fitting: Phi (w/ 4k NN)

temp\_hist 90 Entries 4000  $1.167 \pm 0.002071$ Mean Std Dev  $0.131 \pm 0.001465$ 80 p0  $60.39 \pm 3.50$  $1.02 \pm 0.00$ p1 p2  $0.005 \pm 0.000$  $4.649 \pm 0.839$ p3 70  $1.23 \pm 0.00$ p4  $0.03 \pm 0.00$ p5  $-918.3 \pm 1.1$ p6 60  $710.8 \pm 1.0$ p7 p8  $982.5 \pm 0.7$ p9  $123.5 \pm 0.5$ 50  $-1048 \pm 0.4$ p10 p11  $-759.2 \pm 0.3$ p12  $1299 \pm 0.2$ 40 p13  $-380.2\pm0.1$ 30 20 10 0 0.9 1.2 1.3 1.4 1.5 1.7 1.8 1.1 1.6 1

#### Qvalue Study Fitting: Phi (w/ 4k NN)









#### Qvalue Study Fitting: Phi (w/ 4k NN)









#### Qvalue Study Fitting: Phi (w/ 3k NN)



#### Qvalue Study Fitting: Phi (w/ 3k NN)









#### Qvalue Study Fitting: Phi (w/ 3k NN)









# Qvalue Study Fitting: Phi and Eta (w/ 3k NN)









# Qvalue Study Fitting: Phi and Eta (w/ 3k NN)









#### Fit: Phi (w/ 3k NN) A closer look at Eta

 $\begin{array}{c} 15.27 \pm 0.60\\ 0.5397 \pm 0.0013\\ 0.03451 \pm 0.00083\\ 4 \pm 0.0 \end{array}$ 

0.75

0.8





#### Table of Results and Calculations

Nearest Neighbors	Events	Fit
1k	1256	Phi
2k	1291	Phi
3k	1293	Phi
4k	1259	Phi
3k	318	Phi and Eta

- The number of nearest neighbors doesn't appear to make that much of a difference in terms of the event yield, but does effect the quality of the fit.
- Expected number of Phi Eta events:
  - Events x %20 factor x accidental factor = Expected yield
  - 318 x 5 x (4/7) ~ 900
  - Number of Phi Eta events with accidental subtraction and an elliptical mass side band subtraction: ~ 3500