

Error propagation to the CFFs

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Use 5% variance in F and look at the resulting standard deviation in each of the CFFs **one at a time**, fixing the other two.

- 1 5K F values were generated at each of the 36 angles of ϕ from 0 to 2π for given CFFs that had no errors.

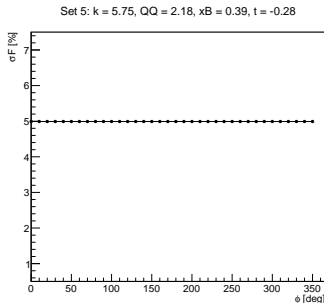
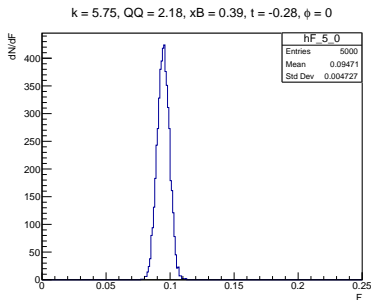


Figure: F distribution example (left) and generated F fixed variance for every ϕ angle (right) at the 5th kinematic setting.

- 2 For every F value, compute $\Re e\mathcal{H}$, fixing $\Re e\mathcal{E}$ and $\Re e\tilde{\mathcal{H}}$ to the values used in step 1, using the following equations:

$$F = F_{BH} + F_{dvcs} + F_I$$

$$\frac{\Gamma}{Q^2|t|} \left[A'_{UU} (F_1 \Re e\mathcal{H} + \tau F_2 \Re e\mathcal{E}) + B'_{UU} G_M (\Re e\mathcal{H} + \Re e\mathcal{E}) + C'_{UU} G_M \Re e\tilde{\mathcal{H}} \right]$$

$$\Re e\mathcal{H} = \frac{Q^2|t|/\Gamma (F - F_{BH} - F_{dvcs}) - (A'_{UU}\tau F_2 + B'_{UU}G_M)\Re e\mathcal{E} - C'_{UU}G_M\Re e\tilde{\mathcal{H}}}{A'_{UU}F_1 + B'_{UU}G_M}$$

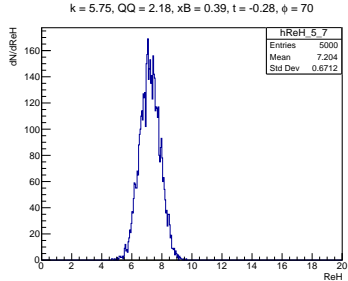
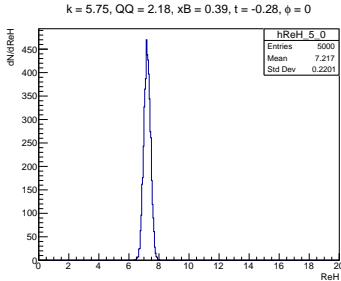


Figure: $\Re e\mathcal{H}$ distribution example for two different angles at the 5th kinematic setting.

- 3 Analogous to step 2, solve the above equations for $\Re\mathcal{E}$ and $\Re\tilde{\mathcal{H}}$ respectively for every F value.
- 4 Obtain σ from the CFFs distribution at the different angles for each kinematic setting.

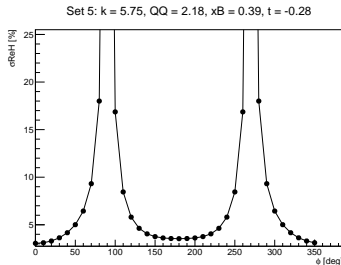


Figure: $\Re\mathcal{H}$ standard deviation for the 5th set obtained one at a time, fixing σF to 5%.

Results

CFFs standard deviation: one at a time at fixed F variance

Strong dependence of the CFFs variation with ϕ , increasing asymptotically at the singularities $\phi_g = 90^\circ$ and $\phi_g = 270^\circ$.

If the variation of F is 5%, for the analyzed kinematics, the standard deviation of $\Re\mathcal{H}$ and $\Re\mathcal{E}$ satisfies:

$$|\phi - \phi_g| \geq 10^\circ \implies \sigma CFFs \leq 20\%$$

Variations smaller than the 5% set for F can be achieved for $\Re\mathcal{H}$ and $\Re\mathcal{E}$ at around $|\phi - \phi_g| \geq 40^\circ$.

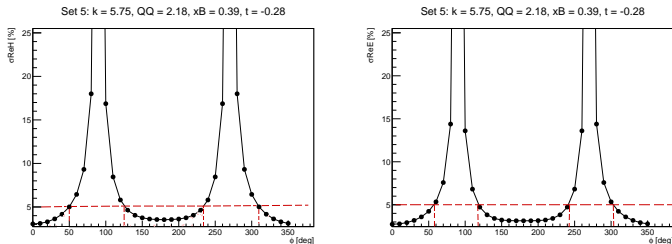


Figure: $\Re\mathcal{H}$ (left) and $\Re\mathcal{E}$ (right) standard deviation for the 5th set obtained one at a time, fixing σF to 5%.

There is a large propagated error to $\Re e \tilde{\mathcal{H}}$, resulting in a variation always greater than about 30% with:

$$|\phi - \phi_g| \geq 40^\circ \implies 30\% \leq \sigma CFFs \leq 200\%$$

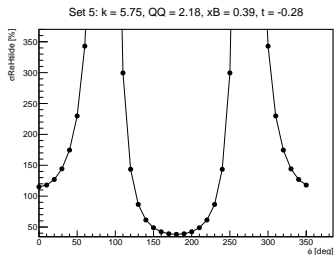


Figure: $\Re e \tilde{\mathcal{H}}$ standard deviation for the 5th set obtained one at a time, fixing σF to 5%.

Results

CFFs standard deviation: one at a time at fixed F variance

The figure below reflects the obtained results, where the deviation from the CFFs values used to generate F (expected values) is consistently large for $\Re\tilde{\mathcal{H}}$ when compared to $\Re\mathcal{H}$ and $\Re\mathcal{E}$; given by the spreading of the standard deviation of $\Re\tilde{\mathcal{H}}$.

$\Re\mathcal{H}$ and $\Re\mathcal{E}$ deviation from the expected value are comparable, falling within 0.3% for $|\phi - \phi_g| \geq 20^\circ$.

$\Re\mathcal{H}$ and $\Re\mathcal{E}$ deviation flips around the expected value, while the mean of $\Re\tilde{\mathcal{H}}$ distribution in ϕ is always greater than the expected value.

This results are valid
for all kinematic settings.

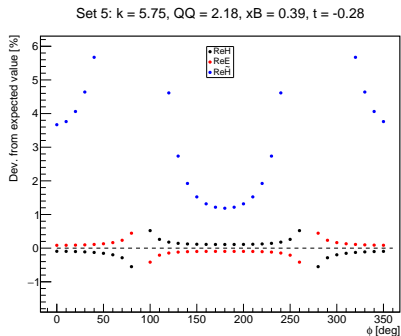


Figure: Deviation from the CFFs values used to generate F for the 5th set.