Error Quantification

σ − Cross section

The cross section has a systematic and statistical error of 0.78 and 0.09 mb, respectively. I need to use the two errors to determine the uncertainty of the $C^2S_{\ell=0}$, i.e. the min. and max crossing point for our fresco model.

- The systematic error of the cross section comes from a 10% error in the ^2H in the target, and a 9% error of the detection efficency.
- The statistical error uses the yield and the down-scaled ion chamber monitor.
- As you stated we are dominated by the 13% error of the systematic uncertainty.

$C^2S_{\ell=0}$

The uncertainty from our spectroscopic factor matching to the cross section is ~15% but I had overestimated it when I reported it as 25% to include systematic uncertainty of our FRESCO model i.e. optical model parameters.

- $\Delta C^2S_{\ell=0}^{stat.}/C^2S_{\ell=0} = 13.4\%$
- $\Delta C^2S_{\ell=0}^{sys.}/C^2S_{\ell=0} = 1.6\%$
- 20% might be more appropriate? (I will continue with 15% for now)

Γ_p

- Single particle proton width, $\Gamma_p^{s.p.}$, 5% systematic error from the FRESCO CRC model and normalization of the wave function. I overestimated the error perviously having an 18% uncertainty.

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Γ_γ

I had an error in my error propagation. now $\Delta\omega\gamma/\omega\gamma = 47\%$ (dominated by $\Gamma\gamma$)