Error Quantification

σ – Cross section

The cross section has a systematic and statistical error of 0.78 and 0.09 mb, respectively. I 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 9% uncertainty in the efficency is dominated by our knowledge of the geometry.
- 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.

- $\Delta C^2S^{stat.}_{\ell=0}/C^2S_{\ell=0} = 13.4\%$
- $\Delta C^2S^{sys.}_{\ell=0}/C^2S_{\ell=0} = 1.6\%$
- Hamill et al. published an 18% uncertainty, 20% might be more appropriate? (I will continue with 15% for now)

Γ_p

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

- The proton width, in the paper had a 27% uncertainty due to the 25% uncertainty in the C^2S.
- The proton width can have an uncertainty as low as 16%, 2.19(0.313 sys.)(0.036 stat.) or 2.19(35) eV.
- This a decrease of 10% from the 2.2(6) eV, thoughts?

Γ_γ

I had an error in my error propagation.

- $\Delta\Gamma_\gamma/\Gamma_\gamma = 36\%$ (same error as branching ratio)
- Now $\Delta\omega\gamma/\omega\gamma = 40\%$ (dominated by $\Gamma\gamma$)