HVQDIS : eN → eA status update:

First Step:

-Adding CTEQ6 to HVQDIS and make sure it runs for eN
-CTEQ6 provide PDF for quark and antiquark for free proton

Second Step:

-Adding EPS09.f to HVQDIS. This code calculate the modification factor for PDF

- Output for EPS09.f :

RUV, RDV, RU, RD, RS, RC, RB, RG

Third Step:

$$f_i^A(x,Q2) = R_i^A(x.Q2) * f_i^P(x,Q2)$$

- Using this formula to get the nuclear PDFs.

- Try Both LO and NLO for C12, Fe56, Pb208

PDFs eN to eA finished adapting up to this point for testing program. But I did not include the isospin symmetry for bound proton and neutron to get U and D quark PDF

Structure Function and Cross section

For eN :

Structure Function :

$$F_P^{2C} = Function(PDF_q^P)$$

Cross_Section:

$$\frac{d^2\sigma}{dxdQ2} = Function(x, Q2, F_P^{2C}, F_L^C)$$

For eA:

$$F_A^{2C} = NA * Function(PDF_q^A)$$

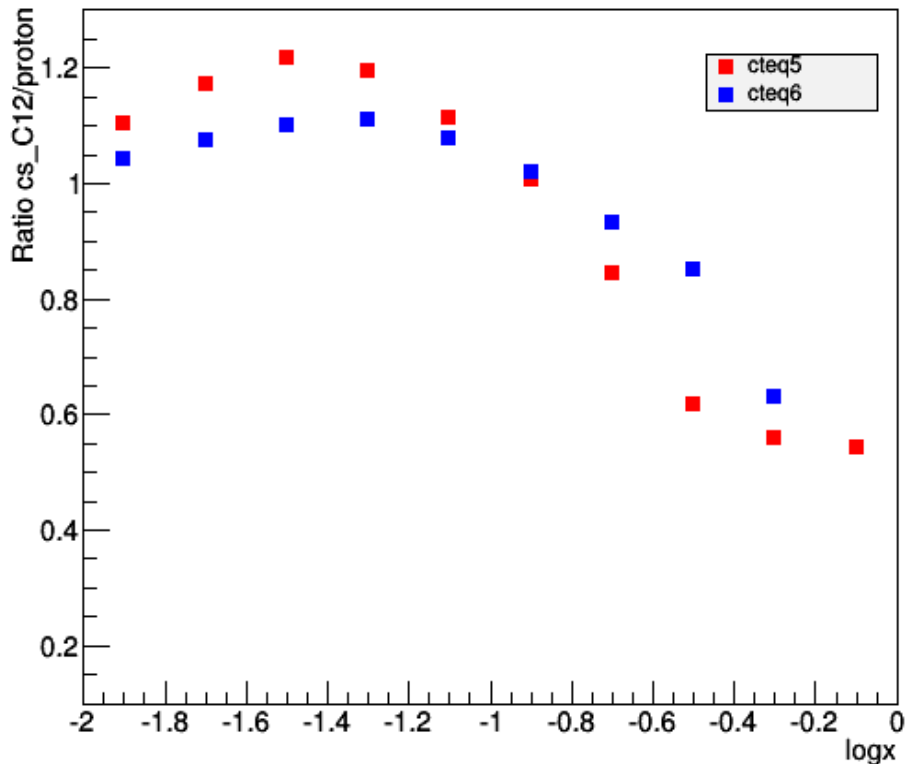$$\frac{d^2\sigma}{dxdQ2} = Factor * Function(x, Q2, F_A^{2C}, F_L^C)$$

My questions:

1. After we got nuclear PDF, Do we need NA factor to get the F2C?

2. For Cross section with F2C calculated use nuclear PDF, Do we need to have any factor on it? Or only thing need to be changed is structure function?

Some tests:

- I only change the nucleon PDF to Nuclear PDF. Everything else stay the same. Mean no NA and Factor

- Then calculate the cs for eN using both CTEQ5 and CTEQ6

-Then Calculate the CS eA using both CTEQ5, CTEQ6 include EPS09 for both C12 and Fe56.

-Then take the ratio of two cross section