Group meeting
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ν cross sections at high energies

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GENIE:

- Try to understand how it computes the cross section.

$$\frac{d\sigma^{\nu,\bar{\nu}}}{dxdy} = \frac{G_F^2 M E_\nu}{\pi}\left[y\left(xy + \frac{m_l^2}{2E_\nu M}\right)F_1 \right.$$
$$+\left(1 - y - \frac{Mxy}{2E_\nu} - \frac{m_l^2}{4E_\nu^2}\right)F_2$$
$$\pm\left[xy\left(1-\frac{y}{2}\right) - y\frac{m_l^2}{4ME_\nu}\right]F_3$$
$$\left.+\left(xy\frac{m_l^2}{2ME_\nu} + \frac{m_l^4}{4M^2E_\nu^2}\right)F_4 - \frac{m_l^2}{2ME_\nu}F_5\right],$$

$$F_2^{CC}(\nu p) = 2x[d\cos^2\theta_c + s\sin^2\theta_c + \bar{u} + \bar{c}],$$
$$xF_3^{CC}(\nu p) = 2x[d\cos^2\theta_c + s\sin^2\theta_c - \bar{u} - \bar{c}]$$

< m_{charm}

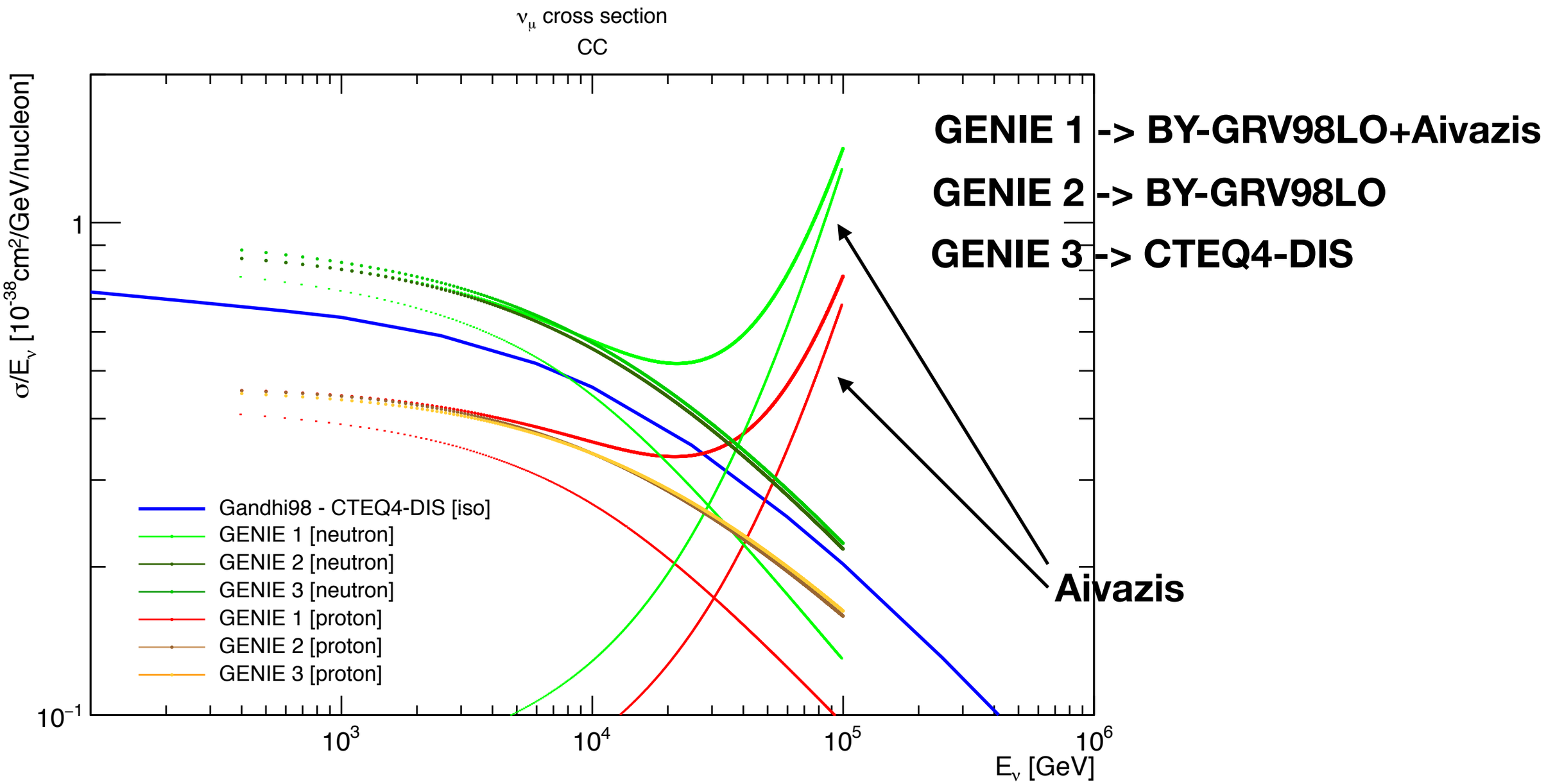
$$F_2^{CC}(\nu p) = 2x[d + s + \bar{u} + \bar{c}],$$
$$xF_3^{CC}(\nu p) = 2x[d + s - \bar{u} - \bar{c}],$$

> m_{charm}

- Nonisoscalar are included.
- Spectral functions depends on the charm production threshold.
- PDF: GRV98LO [$10^{-9} < x < 1$ // $0.8 < Q^2 < 10^6$] including Bodek-Yang corrections (important at low energies).
- DIS charm production treated independently using the Aivazis model (PRD94). This is subtracted from the DIS prediction.
- In the region were RES is important, DIS is reduced to avoid double counting.
- Default neutrino energy limit: 5TeV

GENIE:

- Being able to run up to 100TeV.
  - In this energy $Q^2 > 10^6$ (GRV98LO limit).
  - Other PDFs can be used to solve this problem (currently running CT4Q-DIS for E>100TeV).



GENIE:

- When running Oxygen problems at high energies (not seen with nucleons).
  - Points to some problem with nuclear corrections (checking it).