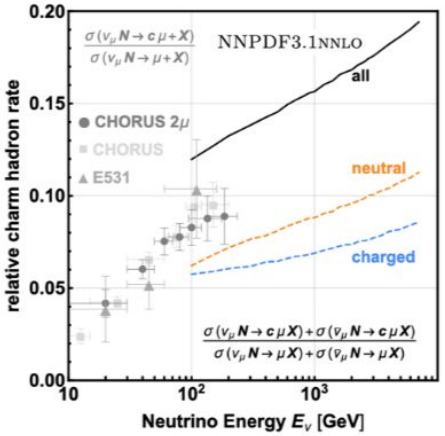
Status charm ratio

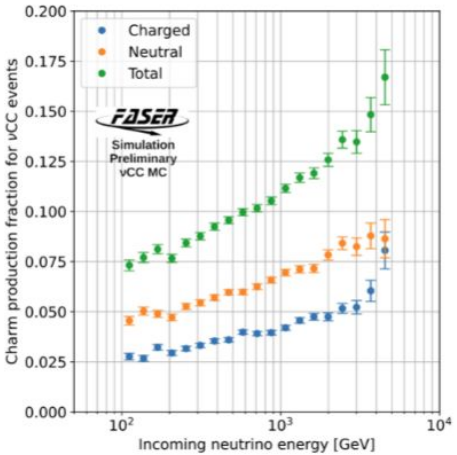
18-2-2026

Recap

Goal:

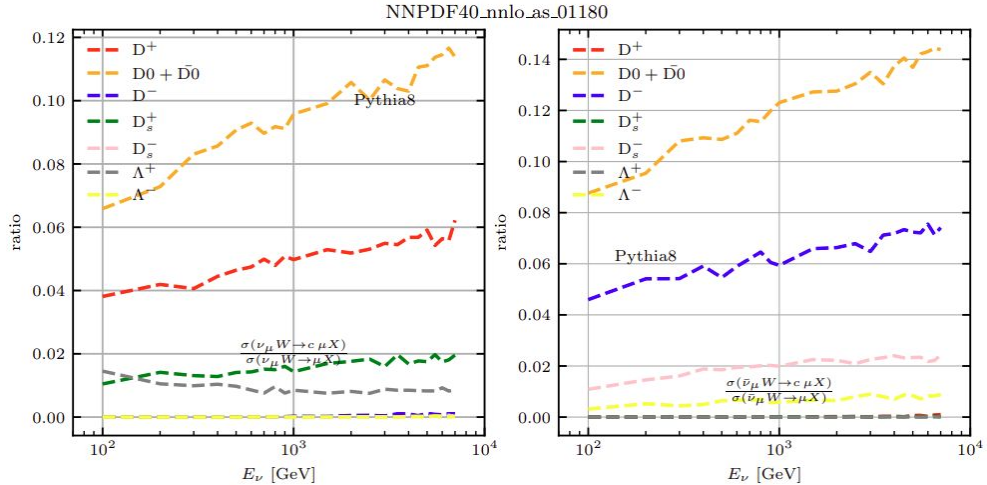
- Quantifying/tagging charm production in (x,Q2) plane at FASER(v)
- Comparison with yadism, POWHEG+Pythia, Pythia standalone
- Compare with NOMAD data

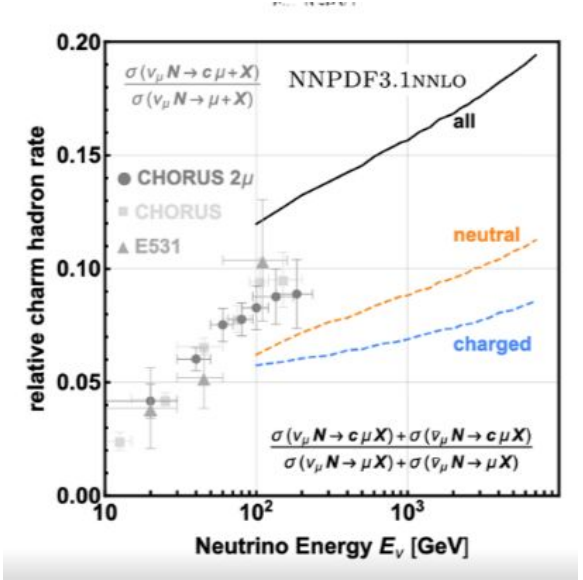




Recent results/problems:

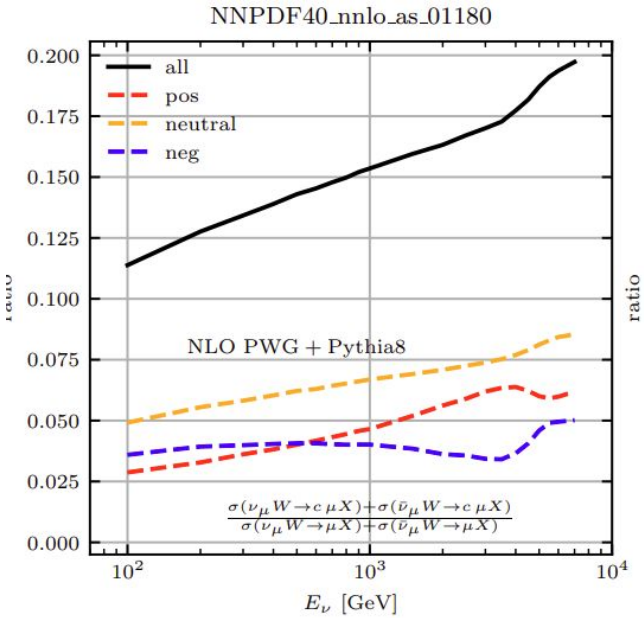
- Pythia8 standalone produces ratio as expected from physics & data arguments.
- From now on set to stable all D0, D+, D0, D+s, D-s

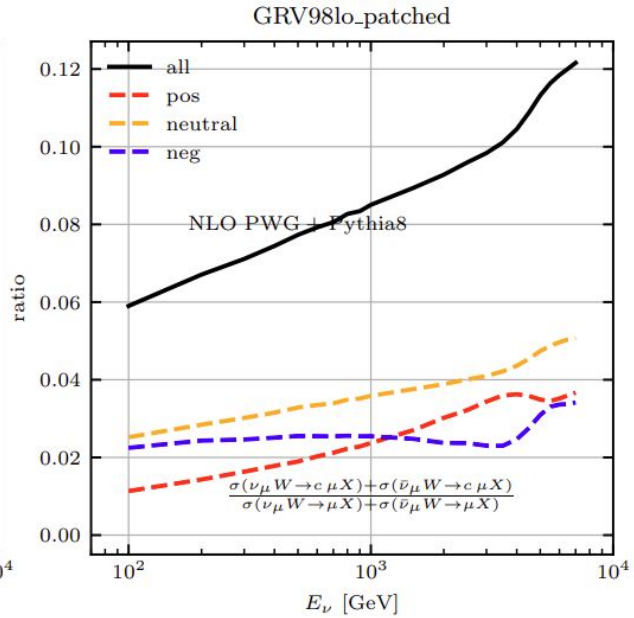


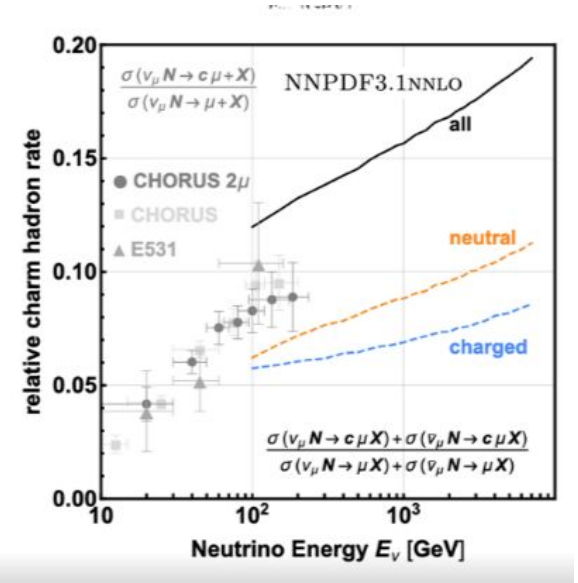


Recent results/problems:

- Final state particles set to stable also in pwg+Py8 and ensured the same shower is used for both setups

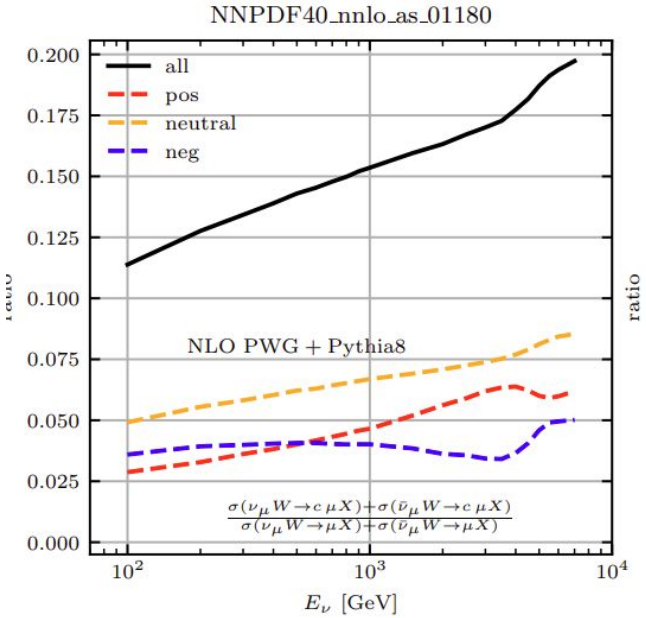


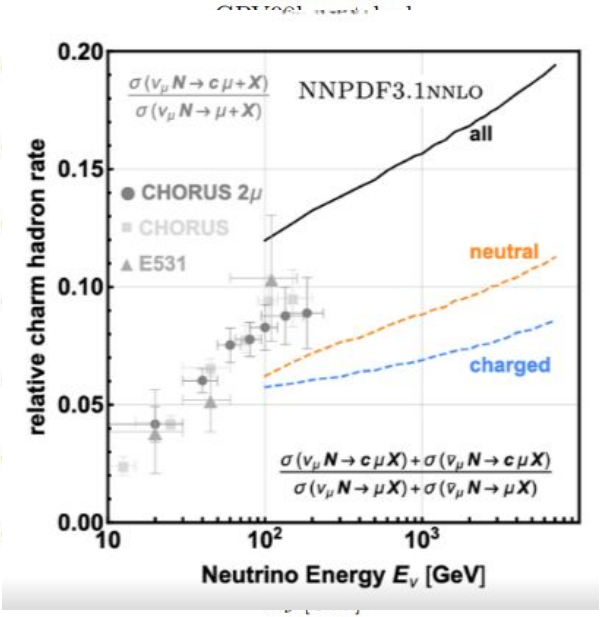




Recent results/problems:

- Final state particles set to stable in pwg+Py8 and ensured the same shower is used for both setups. No cuts.





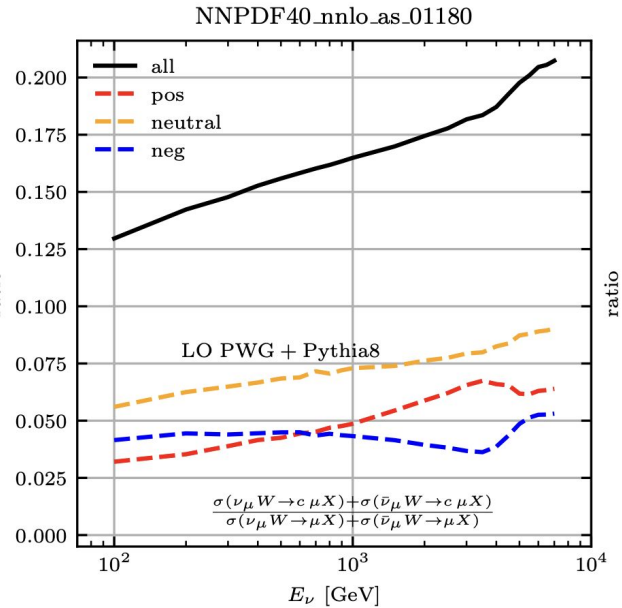
Comments:
- total amount in agreement with data and Pythia

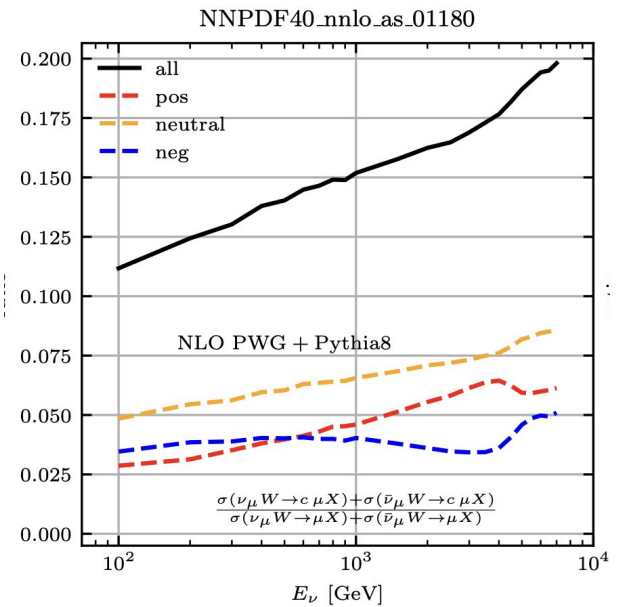
- still more charged than neutral; to this moment unsure why

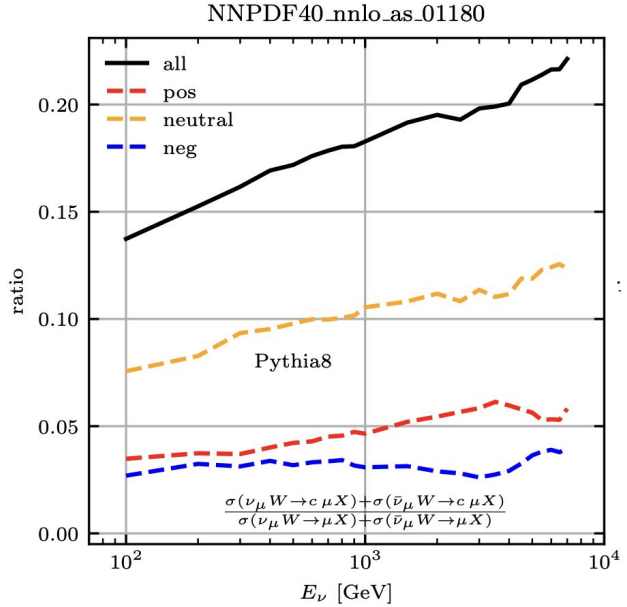
- large impact of chosen pdf on total amount

Recent results/problems:

- pwg+Py8 NLO, LO vs Pythia 8 standalone
- NLO slightly larger total charm production than LO. Less than Pythia st.a.
- Issue with color connection unlikely

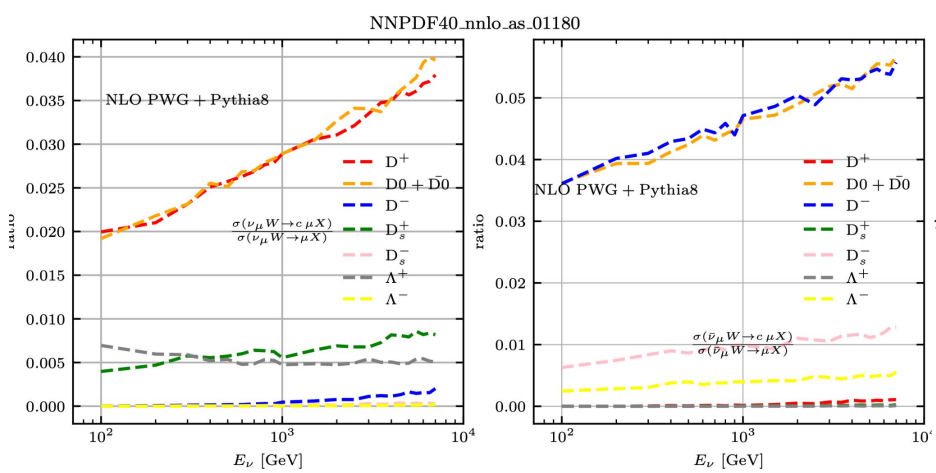


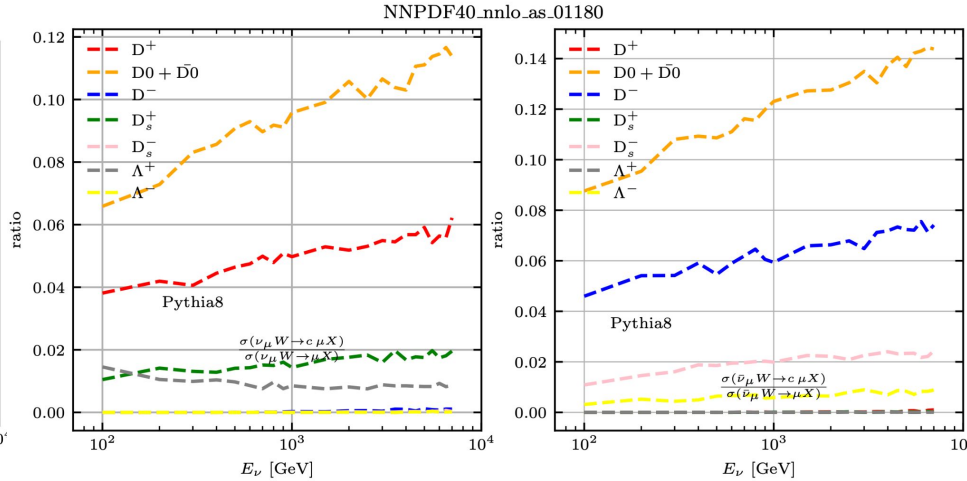




Recent results/problems

- Comparison at the individual particle level would suggest the overall production in pwg+Py8 is too little, as well as ratios between D+/D- and D0. Ratios to other particles seem fine. Potentially wrong decay parameters?





To do

- Main item: investigate why there is too little neutral charm in POWHEG+Pythia8
  As of now tried:
  - Set to stable all D-mesons
  - Ensured same shower settings between pwg+Py8 & Py8 standalone
  - “delete everything and generate your mc again”

  WIP:
  - Look at inclusive distribution using yadism and compare to what POWHEG generates
  - Compute [x,Q^2] dependence to see if powheg fails in a certain region of phase space
  - Check decay rate parameters and related settings

Results will be uploaded to overleaf asap ;-)