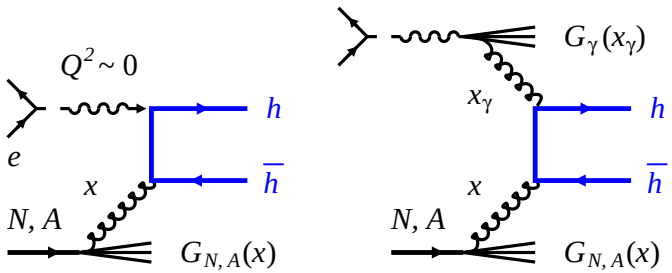
Nuclear gluons with charm: Theory update

C. Weiss, LDRD Project "Nuclear gluons with charm at EIC," Meeting 16-Dec-21

- Charm photoproduction cross sections differential in η, p_T

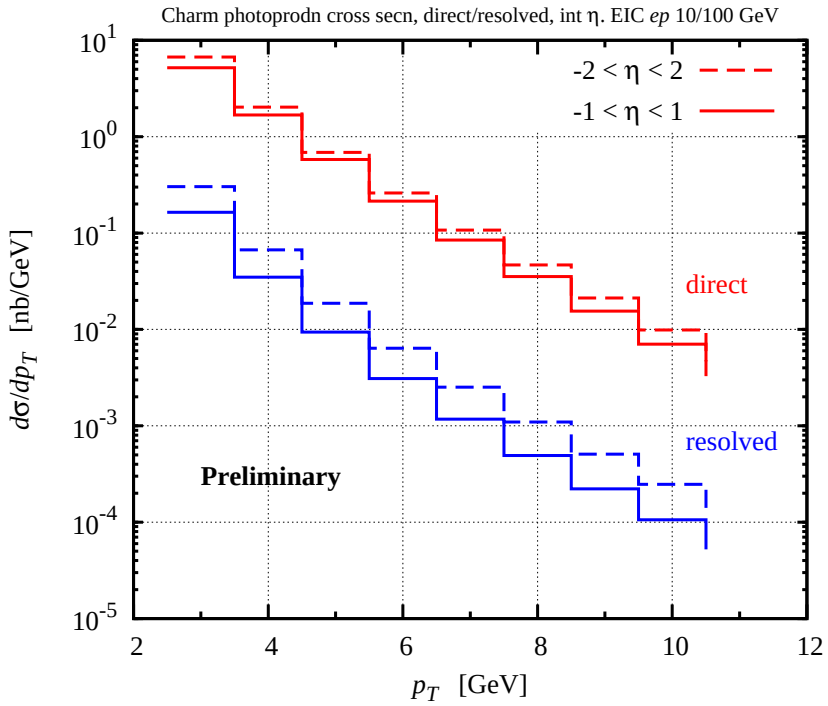
- Nuclear PDFs with updated uncertainties (EPPS16)

Charm photoproduction cross sections



direct

resolved
(also $q\overline{q} - h\overline{h}$)



- Electron as source of quasi-real photons
  - Weizsäcker-Williams spectrum
  - Cutoff set by small-angle electron detection
- HQ prodn by direct and resolved photons
  - Same order in QCD expansion
  - Nucleon's gluons sampled at $x > \dfrac{4M_h^2}{x_\gamma s_{\gamma N}}$
- Differential cross secn code available
  Stratmann, Vogelsang hep-ph/9605330
  - $d\sigma/dp_T$, integrated over η
  - $d\sigma/d\eta$, integrated over p_T
  - Fast MC integration using VEGAS
- Preliminary estimates for EIC
  - Kinematic dependences, rates

Charm photoproduction cross sections II

- Next steps in theory

  Implement contemporary nuclear PDFs, organize code

  Study sensitivity of high-p_T diff cross secn to nuclear modification

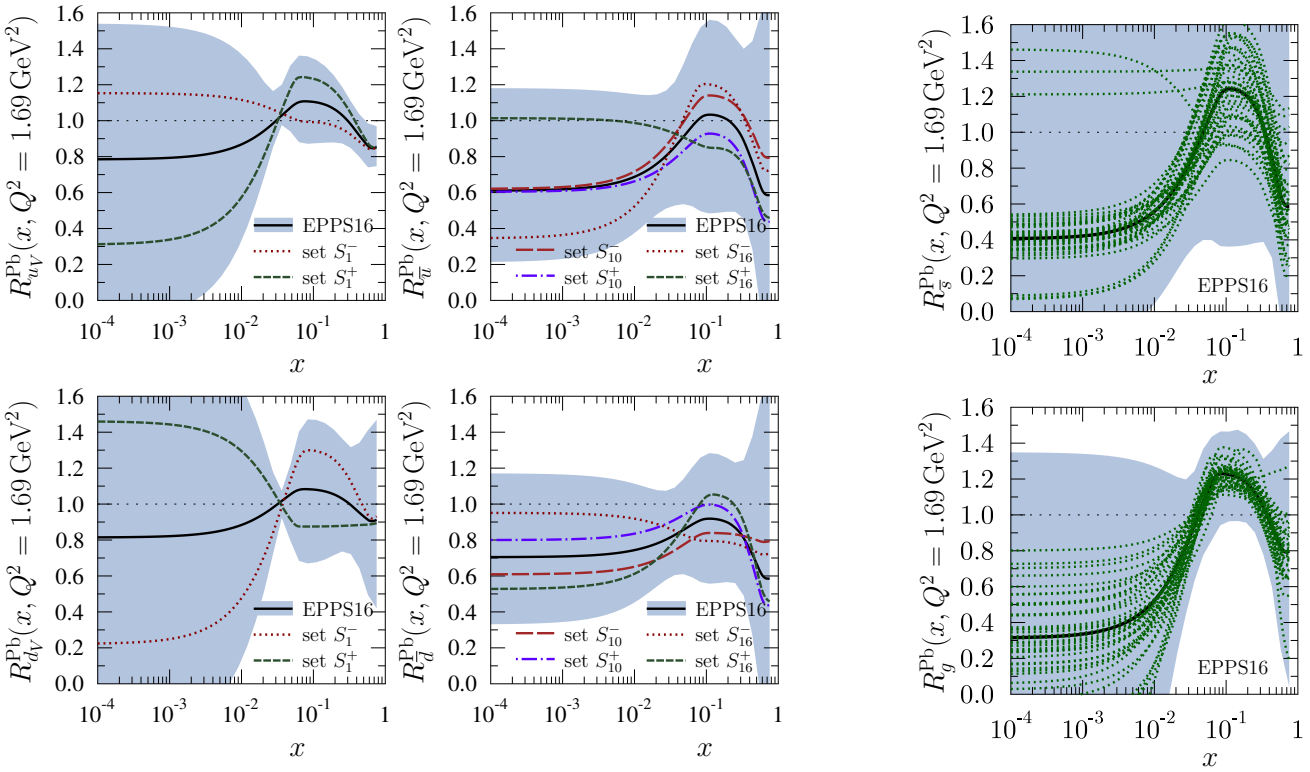
  Quantify impact on PDFs through reweighting

- Next steps in simulations

  Study specifics of high–p_T charm reconstruction

  Explore possibility of double-identified charm measurements

Nuclear PDFs with updated uncertainties



- New global analysis including LHC pA data: Eskola et al. (EPPS16) arXiv:1612.05741
- More freedom for flavor dependence of nuclear modification, updated uncertainties
- Flavor separation with $\pi^+ \pm \pi^-$ at EIC will have impact!
- Gluon uncertainties similar to EPS09