**REFEREE’S COMMENTS:**

*Probing the strange content of the proton with charm production in charged current at LHeC*

[*https://wiki-zeuthen.desy.de/xFitter/xFitter/xFitterInternal/CandidatexFitterAnalyses/CharmCC*](https://wiki-zeuthen.desy.de/xFitter/xFitter/xFitterInternal/CandidatexFitterAnalyses/CharmCC)

We thank the referee for a careful reading of the manuscript. We have made all the suggested changes, and believe this significantly improves the document; details are listed below. We therefore resubmit this work for publication.

1. **To remove possible bias from underlying PDFs when comparing theoretical predictions of different schemes, the authors further compare predictions based on HERAPDF2.0 NLO PDFs with VFNS, FFNS-A, and FFNS-B. It is not indicated in the paper that whether those PDFs, e.g., FFNS-A and FFNS-B, are simply matched to the VFNS set or are indeed refitted to the HERA data. If it is the later case one should comment on how large those PDFs differ since that will also contribute to the final budget of the comparisons.**

The PDFs used here are not refitted but simply taken from the LHAPDF repository with the appropriate alpha-s and quark masses. This leads to small differences at the initial evolution scale, but will not impact the general features that is the focus of this work. We’ve added additional details about the PDFs sets and the differences at the end of 2.1.

1. **At the end of page 6, to be precise, that should be "The approximate NNLO corrections do" especially because it is not explained in the paper on details of that calculation.**

We have clarified our statements here to indicate this is an approximate relation.

1. **On page 8 of the paragraph on top of section 3.3, I was not convinced by the explanation there on observed scheme differences at large-x. From the last panel of the first plot in Fig. 6, it seems to me the discrepancies show no Q2 dependence at all unlike all the other situations. That can not be explained by a single factor of Log[Q2/mc2] resummation.**

We agree that the x behavior is more complicated, and we have modified the discussion to reflect the various competing factors which enter.

1. **On page 8, third paragraph on the right, it is more appropriate referring to charged-current rather than neutral-current scattering.**

Yes, the process is Wg→c sbar

1. **For the next paragraph, it is a little misleading when reading the text together with Figs. 8-10. The apparent impression is that this behavior (negative gluon contributions) only happens for VFNS, which is not true. For example, see Fig. 3 of 1710.04258, in FFNS the gluon contributions can also be negative especially because of the similar subtraction terms from strange-quark PDFs.**

Yes, this is correct. We have modified the text with a footnote including the reference.

1. **In discussions of different partonic contributions, looking at last panel of Fig. 9, it is interesting to see that for FFNS the gluon contributions are always small for x=0.25 while the charm contributions increase with Q2 for VFNS. The authors did not comment on this behaviors. It is likely related to the previous differences of FFNS-A and FONLL-B. Further it will be helpful to also compare with FFNS-B to see the gluon contributions there.**

We regenerated these curves win the FFNS-B scheme and found the same behavior. We have added a comment for this at the end of Sec.3.3. (See attached.)

1. **In Eq.(7) the authors assume a non-linear dependence of the cross sections with the PDF nuisance parameters. It will be good to comment on impact of the non-linear/asymmetric errors, whether it is negligible or not. Also it should be clarified whether the output Hessian PDFs is in symmetric or asymmetric form.**

Our PDFs used symmetric Hessian uncertainties; hence, the discussion of asymmetric uncertainties has been removed to avoid confusion. This change was made in Section 4.1.

1. **There is one recent study, 1906.10127, on projection of LHeC constraints on PDFs including for the strange PDFs. It will be good to compare the result of the strange PDFs with that reference.**

We’ve added a brief note at the end of Sec.4.2.

1. **The PDF profiling was done on top of the ABMP16 and NNPDF3.1 base. It will be interesting to also carry out the same profiling using HERAPDF2.0 base to see the impact if a much more restricted parametrization issued.**

For the HERAPDF2.0, the strange uncertainty was not derived in a manner that is compatible with NNPDF and ABMP. Thus, we used the NNPDF and ABMP to contrast the more restricted paramertrization. We’ve added some details on this in the 3rd paragraph of Sec.4.2.

1. **In summary of the appendix, line 19, "has has" -→"has".**

Thank you, this is now fixed.