We thank the referee for the close reading of our manuscript and for the detailed report which will help us greatly in clarifying various issues. We have addressed the various comments raised by the referee, as we now describe in turn:

1. *This is a classical theoretical papers bias that we try to fight in experimental publications. Any variable used have to be defined: z, x, mu etc... Sometimes in experiments we use different notations and it requires time to guess the meaning of each variable. Same point for section 2.5 page 8. RL/T is not defined.*

   We have implemented the missing definitions.

2. *"Charm PDF is fitted on equal footing as light ..." → It means that the charm PDF is parametrized at Q0? But this is not the case for b-quark? Please be more clear.*

   The case for fitting charm has been discussed in detail in the NNPDF3IC paper [1] while the bottom PDF is treated perturbatively since $m_b >> \Lambda_{\rm QCD}$ and also because the contribution of bottom quarks to the inclusive structure function is very small, 1% at most (and the uncertainties that affect F_2^b are rather larger than those that affect F_2^c).

3. *I would suggest to spend some lines to better describe the assumptions behind LUXqed16/17 and NNPDF3.0QED you have a long discussion of comparing them and not everybody have time to read carefully the papers you refer to (some of the papers like NNPDF3.0 one is 150 pages long).*

   Upon the suggestions of the first referee we have added some more details about these differences. We have added a sentence in Sect 3.1 describing briefly the differences between these fits:

   "As discussed in Sect. 9.2 of Ref. [42], the LUXqed17 set has a improved evaluation of the photon PDF calculation and of the associated error estimates in comparison to LUXqed16."

4. *Page 9: I would like to see a discussion about the disagreement between NNPDF3.1LUXqed and NNPDF3.0 at low x.*

   Upon the suggestions of the first referee we have added some more details about these differences. Following the discussion of Fig. 3.3 we have added a paragraph discussing this point in some detail. This new paragraph reads as follows:

   "As shown in Fig. 3.3, for $x \lesssim 10^{-2}$ the NNPDF3.0QED photon undershoots the 3.1luxQED one both at low and at high scales by an amount which is not covered by the PDF uncertainties of the former. There are two main contributions to such difference. First of all, the inclusion of $\mathcal{O}(\alpha^2)$ and $\mathcal{O}(\alpha\alpha_s)$ terms in the DGLAP equations (absent in NNPDF3.0QED), accounts for a difference of up to 5% when the photon PDF is evolved from $Q_0 = 1.65$ GeV to $Q = 100$ GeV (see also Fig. 2.1), explaining part of the discrepancy. The second, and more important reason, is related to the fact that in NNPDF2.3QED the boundary condition $\gamma(x, Q_0)$ was determined from the DIS and Drell-Yan cross-sections using different settings for the QCD+QED evolution equations [39] as compared to those used later to construct NNPDF3.0QED. This partial mismatch then leads to a suppression of the photon PDF at small-x, explaining most of the differences observed in Fig. 3.3."

5. *The argument that all calculations are using LO MC with NNLO PDF is not very clear to me. I understand that using NLO or NNLO PDF is more or less equivalent since QCD effects are small. But usually LO PDFs have much larger gluon content. Please explain.*

   We think that it is beyond the scope of this work to perform a full-fledged phenomenological analysis. Our goal is to compare the size of PI-initiated effects as compared to the quark- and gluon-initiated contributions. And for this a LO calculation of the QED part if more than suitable, since the NLO correction will be a small correction to that. For example, if we find that PI effects are 20% of the QCD part at LO QED, perhaps at NLO QED it would be say 18%, so the qualitative conclusions of our study are fully unchanged.

6. *Figure 4.5: You may like to extend the range up to pTWW = MWW/2 1.5 TeV. Then you would probably see around pT 1.5 TeV the same kind of effect you see at 3 TeV in MWW.*

   We thank the referee for this suggestion, we will take into account into the detailed phenomenological study of PI corrections at the LHC in which we are working on.

7. *Section 4.3: please state if you include only diagram 3 from figure 4.1 or also gamma gamma -¿ ttbar*

   We thank the referee for this particular question. We have update the draft text saying explicitly that:

   "The `APPLgrid` tables generated for this process include only the $\gamma\gamma \to t\bar{t}$ channel."

8. *I would like to see a discussion why*

   (gamma gluon → ttbar)/(gg → ttbar) << 1

   while

   (gamma gamma → ll)/ DY < 1

   Is it related to the fact that for DY QED contribution is significant only for off-shell Z production where diagram 1 figure 4.1 is significant since it is t-channel ? And for ttbar the main gluon-gluon diagram is already t-channel?

   Following the previous point, we only include $\gamma\gamma \to t\bar{t}$ contributions to the PI predictions. For this process those contributions are negligible in comparison to the $gg \to t\bar{t}$ channel.

9. *page 3: "Overcoming the limitations both two strategies" → "Overcoming the limitations of both strategies".*

   We have fixed the typo.

10. *Figure 4.2: Add please the NNPDF3.0QED uncertainty band to the legend*

    We have modified the caption describing the NNPDF3.0QED uncertainty band.

11. *Figure 4.3: It is not exactly the same. You take the right figure from 4.2 and repeat it twice for high and low mass. Please change a bit the legend to make it less disturbing for the reader.*

    We have replacd in the caption "Same as ..." with "Similar representation as the right panel ...".

References

[1] R. D. Ball *et al.* [NNPDF Collaboration], Eur. Phys. J. C **76** (2016) no.11, 647 doi:10.1140/epjc/s10052-016-4469-y [arXiv:1605.06515 [hep-ph]].