ANSWERS TO THE COMMENTS OBTAINED FROM COLLABORATION MEMEBERS ON

Measurements of $\gamma_v p \to p'\pi^+\pi^-$ cross section with the CLAS detector for 0.4 $\mathbf{GeV}^2 < Q^2 < 1.0$ $\mathbf{GeV}^2$ and 1.3 GeV $< W <$ 1.825 GeV

by G.V. Fedotov, Iu. Skorodumina, V.D. Burkert, R.W. Gothe, K. Hicks, V.I. Mokeev, and CLAS Collaboration

We would like to thank all the Collaboration members, who have sent their comments, thus helping us to improve the paper significantly. The answers to the comments are given below.

Comments by D. Carman

General:

- Figs. 3, 4, 6, 8, 9, 10, 13, 15: I think that you make the presentation less complete when you present these 2D figures in B&W. I strongly recommend that you replace these figures with color versions..
We have tested both options and found that B&W style looks better indeed.

• Page 1:

1. Title: Use "Measurements of the ...".
Done.
2. Note: Throughout the paper you use "$ \gamma_{\rm v} $". This really should be "$ \gamma_v $".
We introduced text letters instead of italic for those indices that correspond to text scripts according to the comment by Whit Armstrong received at the first round of the Ad Hoc review.
3. Abstract: Line 4. Use "... final hadronic system ...".
Done.
4. Abstract: Line 6. Use "... experiments to date.".
Done.
5. Abstract: Line 9. Use "The data offer promising prospects to improve knowledge on ...".
Done.
6. Line 12. Use "During the last several decades, ...".
Done.
7. Line 19. Use "... of the extracted observables ...".
Done.
8. Line 31. Use "... new data for the full integrated ...".
We don't see any particular difference and prefer our version.
9. Line 37. "They are also available on GitHub [3]." I do not think that it is appropriate to cite data on a private github repository for CLAS. The CLAS physicsdb is sufficient and appropriate. I recommend to remove this reference.
We found that to obtain the whole set of the cross sections from the CLAS Physics Database, a user needs to download hundreds of files manually (it means to push hundreds of buttons and spend a lot of time). We provide the github link as a complementary to the main source (CLAS db) for the convenience of those users, who need a quick access to the whole dataset. Additionally, we have already sent the data to Vitaly Chesnokov and hope he will soon upload them to the CLAS db.

10. Line 39. Use "... in W), as well ...".
    Done.
11. Line 40. Use "... statistical uncertainties than were achieved ...".
    Done.
12. Line 41. Use "... cross sections [4-6].".
    Done.
13. Line 58. Use "... range, direct comparisons with these data are not straightforward and are not shown here."
    Done.
14. Line 66. Use "... above the $\Delta(1232)$.".
    Done.
15. Line 71. Use "... Q^2 binning, which is valuable ...".
    Done.
16. Line 74. Use "The most common way ...".
    Done.

- **Page 2:**

1. Line 78. Use "This model, which aims at ...".
   Done.
2. Line 87. Use "... on the kinematic region), which is a very promising ...".
   Done.
3. Line 88. Use "... of the resonant ...".
   Done.
4. Line 91. Use "... within the JM model, ...".
   Done.
5. Line 97. Use "... were acquired at JLab in Hall B ...".
   Done.
6. Line 99. Use "... [1], which consisted ...".
   Done.
7. Line 101. Use "... Drift Chambers (DC), a {\v C|herenkov} ...".
   Done.
8. Line 102. Use "... a Time-of-Flight ... and a sampling ...".
   Done.
9. Line 105. Use "... allowed for the determination of their momenta in the DC.".
   Done.
10. Line 109. Use "... period that lasted from ...".
    Done.
11. Line 112. Use consistent significant figures on beam energies.
    We are not able to find the precise value for the part of the run with about 1 GeV beam energy. However, we prefer to keep all significant digits in "2.039" GeV, since even 1 MeV is essential for some analysis procedures such as momentum corrections. So, we left it as is.
12. Fig. 1 caption. Use "... during the CLAS "e1e" run period.".
    Done.
13. Line 118. Use "... along the z-axis (near the center of CLAS), and ...".
    Done.
14. Line 123. Use "The target cell had 15-μm-thick aluminum entrance and exit windows. In addition, an aluminum foil was located 2.0 cm downstream of the target center.".
    Done.
15. Line 128. Use "... and served for both the estimation ... of events that originated ...".
    Done.

16. Line 132. Use "... included runs with the target cell ...".
    Done.
17. Line 140. Use "Both distributions are normalized to ...".
    Done.

- **Page 3:**

1. Line 147. Use "... target runs shows two peaks that correspond ...".
   We like our version better.
2. Line 150. Use "... a cut on the z-coordinate of the electron ...".
   Done.
3. Line 151. Use "... by the two vertical ...".
   Done.
4. Line 167. Use "... responses were analyzed.".
   Done.
5. Line 168. Do not begin a new paragraph with this sentence.
   We think that the sentence is good.
6. Line 176. Use "In the next step, a so-called sampling fraction ...".
   Done.
7. Line 184. Use "... of $P_{e'}$ should be nearly a fixed constant. This constant is roughly 1/3, since by the EC design ...".
   We don't see any particular difference and prefer our version.
8. Line 195. Use "... while the other two curves ...".
   Done.
9. Line 196. Use "... cut that was determined ...".
   Done.
10. Line 198. Use "... for the experimental data ...".
    Done.
11. Line 208. Use "As was shown ...".
    Done.
12. Line 210. Use "... photoelectrons (the so-called ...".
    Done.
13. Fig. 4 caption. Last line. Use "... that was applied ...".
    Done.

- **Page 4:**

1. Left column: Line 2. Use "... photoelectrons, shifted the measured CC spectrum toward zero ...".
   Done.
2. Left column: Line 5. Use "... buy a more pronounced ...".
   Done.
3. Line 214. Use "... denominator corresponds to the ...".
   Done.
4. Line 223. Use "... As is seen in Fig. 4, ...".
   We like our version better.
5. Line 225. Use "... sector (shown in white).".
   Done.
6. Line 230. Use "... originated from the black ...".
   Done.
7. Line 233. Use "... signals from the inefficient ...".
   Done.
8. Line 235. Use "... as shown in Fig. 5. This peak in the photoelectron ...".
   Done.

9. Line 244. Use "... by the function:

$$y = ..., \tag{1}$$

which is a slightly modified Poisson distribution where ...".
We like our version better since it explains things more consistent.

10. Line 250. Use "Finally, the correction factors defined as:

$$F_{ph.el.} = ..., \tag{2}$$

were applied as a weight for each event that corresponded to the particular PMT."
We like our version better since it explains things more consistent.

11. Line 253. Do not begin a new paragraph with this sentence.
The sentence looks good for us.

12. Line 257. Use "... for a charged particle track, ...".
The TOF system is able to provide timing information for neutral particles, too. So, we prefer to keep our version.

13. Line 258. Use "... candidate was calculated.".
Done.

14. Line 262. Use "... given by:".
Done.

15. Eq.(4) should end with a comma not a period.
Done.

16. Line 271. Use "... is given for scintillator 34 of CLAS sector 1.".
Done.

• Page 5:

1. Line 287. Use "... bands in the experimental ...".
Done.

2. Line 294. Use "... the reconstructed momentum and ...".
we changed to "... the measured momentum and ..." in order to avoid the confusion with the "Monte Carlo reconstructed".

3. Line 296. Use "... effects were of ...".
Done.

4. Line 297. Use "... they could not be simulated ...".
Done.

5. Line 298. Use "... procedure was needed ...".
Done.

6. Line 302. Use "It was shown ... position was shifted from the proton mass value and this shift depended on the CLAS sector."
The suggestion changes the meaning of the sentence. In the Ref.[14] (in the old paper version) the general statement, which is not based on the analyzed dataset, is given. So, we keep our version.

7. Line 306. Use "... effect depended on the ...".
Kept as is for the reason described above.

8. Line 308. Use "... 2.039 GeV, there was a small shift ...".
We do not see any particular difference, so our version was kept.

9. Line 309. Use "... peak position, while Ref. [14] ...".
See the answer to the previous comment.

10. Line 319. Use "... momenta could be neglected.".
We prefer to keep our version.

11. Line 323. Use "... correction, as well as an ...".
Done.

12. Line 332. Use "... due to their interaction ...".
    Done.
13. Line 336. Use "... and, therefore, the effect ...".
    Done.
14. Line 339. Use "... shifts in the distributions ...".
    Done.
15. Line 342. Use "... low-energy protons ...".
    Done.

- **Page 6:**

1. Line 343. Use "... loss in the materials.".
   Done.
2. Line 350. Use "... 4π [1] as the areas covered ...".
   Done.
3. Line 353. Use "In addition, the detection ...".
   Done.
4. Fig. 8 caption: Line 2. Use "... plot shows the ...".
   Done.
5. Fig. 8 caption: Line 5. Use "... curves show the applied ...".
   Done.
6. Line 365. Use "For these particles, sector ...".
   Done.
7. Line 368. Use "... as a function of the angles ...".
   Done.
8. Line 372. Use "... cuts that select ...".
   Done.
9. Fig. 9 caption: Line 2. Use "... plot shows the ...".
   Done.
10. Fig. 9 caption: Line 5. Use "... curves show the applied ...".
    Done.
11. Line 376. Use "... cuts were the best ...".
    We prefer to keep our version, since this statement is general and does not correspond to particular dataset.
12. Line 386. Use "... areas were typically caused ...".
    Done.
13. Line 391. Use "... were different for each CLAS sector.".
    Done.
14. Line 395. Use "... run, variations of the experimental conditions, e.g. fluctuations in the target density or changes in the response of parts of the detector, ...".
    Done.

- **Page 7:**

1. Line 398. Use "Only the parts ...".
   Done.
2. Line 401. Use "... per Faraday Cup (FC) charge ...".
   Done.
3. Line 408. Use "The DAQ live time ...".
   Done.
4. Line 412. Use "... is shown as a function of the DAQ live time and the yields ...".
   Done.
5. Line 419. Use "... two final state hadrons ...".
   Done.

6. Line 421. Use "... can be reconstructed using ...".
   We prefer to keep our version.
7. Line 423. Use "... between four different event topologies depending on the ...".
   Done.
8. Line 425. Use "... final state hadrons (X is the undetected particle):"
   The X there is not necessarily the undetected particle, for example for 3-pion background it corresponds to more than one particle. So, we keep our version.
9. Fig. 11 caption: Line 1. Use "... of blocks as a function of DAQ ...".
   Done.
10. Fig. 11 caption: Line 2. Use "... and the yields ...".
    Done.
11. Fig. 11 caption: Line 4. Use "... lines show the applied cuts.".
    Done.
12. Line 431. Use "... conditions, topology 1 ...".
    Done.
13. Line 434. Use "... among the other ...".
    Done.

- **Page 8:**

1. Fig. 12 caption: Line 2. Use "... for the four event topologies ...".
   Done.
2. Fig. 12 caption: Line 5. Use "... while the curves are from the simulation. The plot shows the ...".
   Done.
3. Line 450. Use "cannot".
   Done.
4. Line 455. Use "... and the absence of ...".
   Done.
5. Line 461. Use "... 50%), but also to ...".
   Done.
6. Line 469. Use "... final state hadrons, ... four-momenta of the initial state ...".
   Done.
7. Line 475. Use "... final state particles.".
   Done.
8. Line 479. Use "... curves show the simulation. The plots in Fig. 12 represent topologies ...".
   Done.

- **Page 9:**

1. Line 498. Use "... calculations, experimental events ...".
   Done.
2. Line 501. Use "... simulation, the reconstructed .... subject to the same summation.".
   Done.
3. Line 506. Use "... final state hadrons were known ...".
   We prefer to keep our version.
4. Line 513. Use "... sections were obtained ...".
   Done.
5. Line 527. Use "... final state hadrons ...".
   The sentence was changed to *"The kinematic variables that describe the final hadronic state are calculated from the four-momenta of the final hadrons in the c.m.s."*.
6. Line 534. Use "... final state hadron description ...".
   The sentence was changed to *"There are several ways to choose the five variables for the description of the final hadronic state."*.

7. Line 537. Use "... pair of hadrons ...".
   Done.
8. Line 539. Use "... pair of hadrons ...".
   Done.
9. Line 542. Use "... between the two plans (i) defined by the ... and the first final state hadron and (ii) defined by the three-momenta of all final state hadrons ...".
   Done.
10. Line 564. Use "... encompasses about 1.2 million ...".
    Done.
11. Line 567. Use "... final state hadron ...".
    The collocation was changed to *... in the hadronic variables ....*
12. Line 571. Use "... 1.22 GeV, as well as ...".
    Done.
13. Line 574. Use "Special attention was required for ..."
    We prefer to keep our version in order to keep the generality of the statement.

- **Page 10:**

1. Table I caption. Use "... final state hadron ..."
   The collocation was changed to *... in the hadronic variables..*
2. Line 582. Use "... M_{upper} was calculated ...".
   Done.
3. Line 607. Use "... extracting the cross sections, the event yield was divided .."
   Done.
4. Line 608. Use "... width ΔM, thus ...".
   Done.
5. Line 612. Use "... data were not sufficient ...".
   Done.
6. Line 616. Use "... which was different ...".
   Done.
7. Line 620. Use "In addition to the above ...".
   Done.
8. Line 622. Use "... variable was assigned ...".
   Done.
9. Line 624. Use "... behavior, the ... size caused ...".
   Done.
10. Line 627. Use "... applied that included ...".
    Done.
11. Line 628. Use "... to 4% for some ...".
    Done.

- **Page 11:**

1. Line 634. Use "... of this paper) ...".
   Done.
2. Line 635. Use "... σ_e via:"
   Done.
3. Eq.(9) should end with a period.
   Done.
4. Line 636. Use "Here $d^5\tau$ is ...".
   Done.
5. Line 637. Use "... state that were described in Sec. IV A.".
   Done.

6. Line 638. Use "... photon flux given by"
   Done.
7. Eq.(11) should end with a period.".
   Done.
8. Line 643. Use "Here $\nu = ...$".
   Done.
9. Line 651. Use "... event was weighted ...".
   Done.
10. Line 660. Use "... hydrogen, and N_A ...".
    Done.
11. Line 664. Use "... simulation and R ...".
    Done.
12. Line 683. GENEV needs a reference.
    Done.
13. Line 691. Use "... approach in Ref. [15].".
    Done.
14. Line 694. Use "... procedures. The efficiency ... was then calculated in ...".
    Done.
15. Line 702. Use "... and increased up to a few ...".
    Done.

- **Page 12:**

1. Fig. 15 caption. Line 2. Use "... uncertainty vs. efficiency.".
   Done.
2. Line 710. Use "cannot".
   Done.
3. Line 712. Use "... along with the other ...".
   Done.
4. Line 714. Use "... and, therefore, some model ...".
   Done.
5. Line 725. Use "Additionally, the efficiency in some ...".
   Done.
6. Line 726. Use "... due to boundary effects, ...".
   Done.
7. Line 729. Use "These cells could be differentiated from the cells with reliable efficiency by their larger relative ...".
   We prefer to keep our version in order to maintain the generality of the sentence, but we removed the article "the" in front of "reliable efficiency".
8. Line 737. Use "As is seen in ...".
   We like our version better..
9. Line 740. Use "... efficiency was obtained ...".
   Done.
10. Line 752. Use "... 22], as well as ...".
    Done.
11. Line 753. Use "... and, therefore, provides ...".
    Done.
12. Line 755. Use ".. describes in detail the approach ...".
    Done.
13. Line 760. Use "... to the case when the ...".
    Done.
14. Line 761. Use "... cells was ignored, and ...".
    Done.

15. Line 762. Use "... for the case when the empty cells were taken into account ...".
    The collocation was changed to *"... for the case when that was taken into account ..."***.**
16. Line 763. Use "The black curves represent the TWOPEG cross sections that were ...".
    Done.
17. Line 766. Use "... from the empty cells ...".
    Done.
18. Line 770. Use "... due to the negligible/zero CLAS acceptance in these regions.".
    The sentence was changed to "... due to the negligible/zero CLAS acceptance in the corresponding directions."
19. Line 776. Use "... total statistical uncertainty, as was done in Refs. [6,22].".
    Done.
20. Line 780. Use "... using the TWOPEG ...".
    Done.
21. Line 781. Use "... [21], which accounts ...".
    Done.
22. Line 783. Use "... known approach of Ref. [15].".
    Done.
23. Line 785. Use "... cross sections from the non-radiative cross sections."
    We prefer to keep our version.
24. Line 787. Use "... in TWOPEG, the double-pion ...".
    Done.
25. Line 790. Use "... electron (the so-called ...".
    Done.
26. Line 792. Use "In Refs. [15,21] the ...".
    Done.

- **Page 13:**

1. Fig. 16 caption: Line 1. Use "... for the cases when the contribution ...".
   Done.
2. Fig. 16 caption: Line 2. Use "... when it was taken into ...".
   Done.
3. Fig. 16 caption: Line 3. Use "... while the latter are with the ...".
   Done.
4. Line 814. Use "... final state hadron ...".
   Done.
5. Line 817. Use "... final state hadron ...".
   Done.

- **Page 14:**

1. Fig. 17 caption. Line 1. Use "The quantity $1/R$ (see Eq.(15)) as ...".
   Done.
2. Line 848. Use "... of the efficiency,".
   Done.
3. Line 850. Use "... by Eqs. (16) and (17) ...".
   Done.
4. Line 857. Use "... sections, the total ...".
   Done.
5. Line 876. Use "... as uncertainties in the electron registration ...".
   We prefer to keep our version.
6. Line 882. Use "... were summed up in ...".
   Done.

7. Line 883. Use "... alternative method considers ...".
   We prefer to keep our version.
8. Line 889. Use "... includes the uncertainties due to ...".
   We prefer to keep our version.

- **Page 15:**

1. Fig. 18 caption: Line 1. Use "... shadowed area for each point is the total cross section ...".
   Done.
2. Fig. 18 caption: Line 3. Use "... the total systematic uncertainty. The error ...".
   Done.
3. Fig. 18 caption: Line 4. Use "... curves are the cross section prediction ... dashed curves correspond ..."
   Done.
4. Line 916. Use "... extracted integrated cross ...".
   Done.
5. Line 917. Use "... are shown by the black circles ...".
   Done.
6. Line 918. Use "... shadowed areas correspond ...".
   Done.
7. Line 921. Use "... systematic uncertainty."
   Done.

- **Page 16:**

1. Fig. 19 caption: Line 2. Use "... curves are the cross section ...".
   Done.
2. Fig. 19 caption: Line 3. Use "... dashed curves correspond ...".
   Done.
3. Line 935. Use "... due to the high ...".
   Done.
4. Line 942. Use "... sections. This model aims at ...".
   Done.
5. Line 947. Use "... results is based on the JM model estimations of ...".
   We prefer to keep our version.
6. Line 949. Use "... differential), as well as ...".
   Done.
7. Line 955. Use "... sections was obtained ...".
   Done.
8. Line 957. Use "This generator employs the ...".
   Done.

- **Page 17:**

1. Line 962. Use "... of the model ...".
   Done.
2. Line 975. Use "... for the integrated ...".
   Done.
3. Fig. 20 caption: Line 2. Use "... integrated double-pion ...".
   Done.
4. Fig. 20 caption: Line 3. Use "... details). The different symbols ...".
   Done.
5. Line 982 (and following). Use the updated PDG format for listing resonances, e.g $P_{11}(1440)$ –¿ $N(1440)1/2^+$.
   We made the footnotes with the notations in the updated PDG format.

6. Line 987. Use "... data on the Q^2-dependences of the resonance ...".
   Done.
7. Line 988. Use "Additionally, the states ...".
   Done.
8. Line 992. Use "... values of their electrocouplings ...".
   Done.
9. Line 1004. Use "... for the integrated ...".
   Done.
10. Line 1007. Use "These contributions were obtained as the ratio of ...".
    We prefer to keep our version.
11. Line 1011. Use "... with increasing W and Q^2, consistent with ...".
    Done.
12. Line 1012. Use "... 1.5 GeV, this contribution ...".
    Done.
13. Line 1023. Use "... extracted integrated ...".
    Done.
14. Line 1024. Use "... [4], which were obtained with a ...".
    We prefer to keep our version.
15. Line 1035. Use "... two in Ref. [4], the map of the empty cells ...".
    Done.
16. Line 1039. Use "... binning in the hadron ...".
    Done.
17. Line 1043. Use "CONCLUSIONS AND OUTLOOK".
    Done.
18. Line 1044. Use "... on integrated and ...".
    Done.
19. Line 1047. Use "The results are a significant improvement over previously ... in this kinematic region due to the extension in the W coverage and due to the increased statistics, thereby ...".
    Done.

- **Page 18:**

1. Fig. 21 caption. Line 2. Use "... and statistical uncertainties) ...".
   Done.
2. Fig. 21 caption. Line 3. Use "... for the results from Ref. [4] ("e1c"), it is ...".
   Done.
3. Line 1052. Use "... in the CLAS physics ...".
   Done.
4. Line 1073. Use "... acceptance, in this way achieving a very ...".
   Done.
5. Line 1088. Use "... contribution that grows ...".
   Done.
6. Line 1091. Use "... extraction of the resonance electrocouplings.".
   Done.

- **Page 19:**

1. Line 1133. Use "... from the other sets of variables are ...".
   Done.
2. Line 1135. Use "... between the two planes A ...".
   Done.
3. Line 1138. Use "... all final state hadrons.".
   Done.

4. Line 1140. Use "... the c.m.s. their ...".
   Done.
5. Fig. 22 caption: Line 2. Use "... final state hadrons ...".
   Done.
6. Fig. 22 caption: Line 3. Use "... of the π^- and ...".
   Done.
7. Fig. 22 caption: Line 4. Use "... of the auxiliary ...".
   Done.
8. Line 1146. Use "... along the z-axis.".
   Done.
9. Line 1149. Use "... plane B. The angle between the two planes ...".
   Done.
10. Right Column: Line 8. Use "... and in the case of ...".
    Done.
11. Right Column: Line 1161. Use "... to see that ...".
    Done.
12. Right Column: Line 1163. Use "... about the kinematics of the reactions ...".
    Done.

- **References:**

1. Give URL for all CLAS-Notes.
   Done.
2. You do not need to include arXiv listings for already published papers.
   We prefer to keep them in order to facilitate the paper search.
3. Refs. [2], [3]. You have an extra space before the period.
   Done.
4. Ref. [15]. Use "... Rev. Mod. Phys. ...".
   Done.
5. Ref. [22]. Use "... to be published ...".
   Done.

Comments by V. Mokeev

In the recent paper on $\pi^+\pi^- p$ electroproduction off protons by G. Fedotov, Iu. Skorodumina, et al., my previous questions on reliability of the statistical error bars for the experimental data were fully addressed. I think it is important for us to provide appealing presentation of these new results in order to maximize their impact on hadron and strong QCD physics.

I have both "Major physics comments" and complementary "Editorial suggestions". I have strong feeling that the "Major physics comments" should be implemented perhaps with edits. In a case of disagreement on implementation of the major comments, I appreciate to know the reasons.

Major physics comments

1. p.1 line 24. Ref [1] should be extended as:

   Ad1. V.D. Burkert, Eur. Phys. J. Web Conf. 134, 01001 (2017).
   Ad2. V.D. Burkert and C.D. Roberts, arXiv1710.02549[nucl-ex].
   Ad3. Iu. A. Skorodumina et al, Moscow Univ, Phys. Bull,70, 015203 (2015).
   Ad4. I.G. Aznauryan and V.D. Burkert, Prog. Part. Nuvcl. Phys. 67, 1 (2012).

   These references in Introduction, in my view, should introduce the place of our paper in the field of the N* physics.
   The Ref.[1] (in the old paper version) corresponded to the CLAS detector description, therefore

it should not be extended in the suggested way. However, we have added the following Refs. to the end of the first paragraph and to the beginning of the fifth paragraph of introduction, where they are relevant.

[1] **V. D. Burkert (CLAS), EPJ Web Conf. 134, 01001 (2017), arXiv:1610.00400 [nucl-ex].**
[2] **B. Krusche and S. Schadmand, Prog. Part. Nucl. Phys. 51, 399 (2003), arXiv:nucl-ex/0306023 [nucl-ex].**
[3] **I. G. Aznauryan and V. D. Burkert, Prog. Part. Nucl. Phys. 67, 1 (2012), arXiv:1109.1720 [hep-ph].**
[4] **I. A. Skorodumina et al, Moscow Univ. Phys. Bull. 70, 429 (2015), [Vestn. Mosk. Univ.,no.6,3(2015)].**

2. p. 1 line 63. high sensitivity → essential sensitivity.

   Please note that for N(1440)1/2+, N(1520)3/2-, N(1535)1/2-, N(1675)5/2-, and N(1680) 5/2+ resonance which are heavier than Δ, the $N\pi$ exclusive channels are the driving source of the information on their electrocouplings.
   Done.

3. p.15 line 925. after "...are reported" add Full data set is available in the CLAS Physics Data Base [2] (reference for the current paper version)
   The sentence "The whole set of the extracted cross sections is available in the CLAS physics database..." was added as the third paragraph in the section V.

4. p.17 left and right. Remove the text between lines 988-998 "Beside that.... from Ref [7]" (see justification in my previous e-mail, which is attached below)

   in p. 17 lines 988-998 we have the statement which should be removed from the paper text.

   First, we have no P13(1700) resonance at all, we do have P11(1710) or N(1700)1/2+ in the PDG notation. The contribution from $\Delta(1600)3/2+$, N(1675)5/2-, and N(1710)1/2+ to the $\pi^+\pi^-p$ electroproduction off protons at Q^2 <1.0 GeV^2 is inside the data uncertainties. We never have information on these state electrocouplings at Q^2 <1.0 GeV^2 from the CLAS data. References [7,33] in the paper text (lines 988-998) are just irrelevant. The paper [7] reports electrocouplings of N((1440)1/2+, N(1520)3/2-, and $\Delta(1620)1/2-$ states, but DO NOT report anything on $\Delta(1600)3/2+$ or P33(1600) state. The paper [33] does report electrocouplings of N(1675)5/2-, N(1710)1/2+ states BUT at Q^2 >1.7 GeV^2, while the Q^2-coverage of the $\pi^+\pi^-p$ electroproduction data in Fedotov/Skorodumina paper is limited by Q^2 <1.0 GeV^2. Moreover, according to Fig.19,22 in Ref [33], electrocouplings A1/2 of N(1675)5/2-, and N(1710)1/2+ resonances demonstrate pronounced Q^2-dependence in contrast with the statement in lines 988-998 in the Fedotov/Skorodumina paper on their Q^2-independence. At W <1.8 GeV covered by Npipi data, the contributions from the tails of the $\Delta(1905)5/2+$ and $\Delta(1950)7/2+$ are inside the data uncertainties.

   In my view, the best way to proceed with this problem is: just to remove the text between the lines 988-998

   "Beside that the states.....taken from Ref [7]"

   The paper contains the new $\pi^+\pi^-p$ of the best quality ever published for Npipi electroproduction. For this reason this paper should be published, but without confusing statement on data interpretation, which does not affect the paper core, that is the presentation of the new data set.

   We made a typo listing the resonances. P13(1700) was changed to D13(1700).

   You are right, the Ref.[33] (in the old paper version) was irrelevant. So, it was removed. However the reference [7] (in the old paper version) was kept, since for the resonances $P_{33}(1600)$, $D_{15}(1675)$, $D_{13}(1700)$, $F_{35}(1905)$, and $F_{37}(1950)$ we took the values of electrocouplings that were used for the study [7].

   You are right, the contribution from the resonances $P_{33}(1600)$, $D_{15}(1675)$, $D_{13}(1700)$ is very small, therefore we changed our text in order to emphasize that better.

The resonances $F_{35}(1905)$, and $F_{37}(1950)$ were found to give from 2% to 20% of the total resonant contribution as W grows from 1.7 GeV to 1.8 GeV. The corresponding sentence was added into the paper.

5. p. 17 line 985. The electrocouplings of these nine states → The electrocouplings of the relevant nucleon resonances in the investigated Q^2 range were taken from fit of the available results [Ad5] on Q^2-dependencies of resonance electrocouplings extracted from the CLAS π^+n, π^0p, ηp and $\pi^+\pi^-p$ exclusive electroproduction off proton data [7,9,26-35]

   Ad 5 https://userweb.jlab.org/∼mokeev/resonance_electrocouplings/

   The suggested reference was added. We also made the following changes in the corresponding part of the text and provide there the direct reference to the study [10] (in the new paper version), where the things that you mentioned are explained in details. "The electrocouplings of these nine states in the investigated Q^2 range were evaluated using the functions of their Q^2-dependences taken from the study [10]. These functions were obtained as a polynomial fit of the available data on the resonance electrocouplings including those at the photon point[11,13,31-41]. Ref. [10] describes in detail the fit procedure."

6. p. 17 before "For all resonance states..." add

   Electrocouplings of the excited nucleon states in the mass range up to 1.6 GeV are currently available at photon virtualities $0< Q^2 <5.0$ GeV^2. In computation of the resonant contributions they were estimated by interpolating the experimental results [Ad5] onto the Q^2-grid of our $\pi^+\pi^-p$ data. The results on longitudinal electrocouplings $S_{1/2}$ for most nucleon resonances with masses above 1.6 GeV are limited by the photon virtualities $Q^2 >0.5$ GeV^2. For these high mass resonances, A1/2 electrocouplings were determined by interpolating the available experimental results including those at the photon point. Instead, S1/2 electrocouplings were interpolated at photon virtualities $Q^2 >0.5$ GeV^2, while within narrow Q^2-interval $0.4 < Q^2 < 0.5$ GeV^2 we extrapolated their values assuming that they are equal to the interpolated values at Q^2=0.6 GeV^2 for each resonance.

   All approximations used in the evaluation of the resonant contribution should be written down.

   We have written down the approximations used in the evaluation of the resonant contribution. The following text was added. "Due to the scarce data on electrocouplings close to the photon point and the fact that the $S_{1/2}$ does not exist at the photon point, the fit for the $S_{1/2}$ electrocoupling of the resonances $S_{31}(1620)$, $F_{15}(1680)$, and $P'_{13}(1720)$ is unreliable at $Q^2 \lesssim 0.6$ GeV^2. Therefore, for these three states at $Q^2 \lesssim 0.6$ GeV^2 the constant value of the $S_{1/2}$ taken at the last available Q^2 point was used."

   Beside that a computational mistake was found and corrected, therefore, Fig. 20 slightly changed and became more self-consistent. No additional manipulations with the electrocouplings were made on this way.

7. p.17 lines 1011-1012. ...consistent with previous studies [5,6] → consistent previous studies [5]

   Studies [6] cover $Q^2 >2.0$ GeV^2. Resonant contributions at $Q^2 >2.0$ GeV^2 and at $Q^2 <1.0$ GeV^2 are just incompatible. There is no way to confront them.

   Being obtained in different Q^2 regions, the resonant contributions can either be consistent or inconsistent with each other. The word "consistent" here is used in the meaning "compatible with". Therefore, the Ref.[6] (in the old paper version) should be kept.

   Beside that, we have extended the reference set with Ref.[12] (in the new paper version), which also reports the resonant contributions to the cross sections in the close kinematic region.

Editorial suggestions

1. p2. line 77. the JM model [7]→ the JM model [7,9,12,16]
   This reference should not be extended with Refs.[12,16] (in the old paper version) since they do not refer to the JM model. The references [7-9] are given in the next sentence.

2. p.3 line 160 Abbreviations DC, CC, TOF, and so on, should be defined before not after their first use in the text.
   The abbreviations DC, CC, TOF, and EC are firstly introduced on page 2, Section II, first paragraph.

3. p. 3 line 181 π^- losses $\rightarrow$ π^- ionization losses

   Note that π^- can suffer also nuclear interactions producing high energy tail for the deposited energy
   "loses" is a verb there.

4. p3 line 194 and Fig. 3 I was unable to see the vertical line in Fig. 3
   "line" was changed to "line segment".

5. p.5 line 294. the momentum $\rightarrow$ the measured momentum
   Done.

6. p. 5 lines 315-319 "'Here, due to....can be neglected"

   This part is not fully clear, in particular for outsider-readers.

   Which total momentum we are speaking about, in which frame? In the CM, the total momentum of the final hadrons or the initial photon and proton is equal to zero. The fraction of zero makes no sense. Total momentum of the final hadrons should be equal of the total momentum of the initial photon and proton for any reaction. So, if we are speaking on the fraction of the energy-momentum transfer through the virtual photon which is carried out by each final hadron, it is in fact smaller in Npipi in comparison with Npi, while the absolute values of the final hadron momenta are fully determined by the W and by the five kin. variables for the final state kinematics. I propose to re-phrase this paragraph making it more clear.
   Here we are talking about the hadron momenta in the lab. frame. The total momentum there is equal to the beam energy.

7. p.6 line 372. I propose to define more quantitatively "...a relatively flat particle density"
   This comprehensive collocation was formulated at the stage of the Ad-Hoc review, and we prefer to keep it.

8. In Fig. 10 there is depletion at theta 10-20 deg. How we treat this depletion? If it is outside the fiducial cut, may be the fiducial cut should be shown in Fig. 10?
   We do not know exactly the origin of this depletion and can suppose that this is due to the dead DC wires. It is reproduced by the MC and hence does not affect the cross section.

9. Fig. 11 ...blocks as function of DAQ time $\rightarrow$ ...blocks versus DAQ time
   We prefer to keep our version.

10. Fig. 12. It is unclear to which integral the distributions are normalized.
    As it is written there the distributions are normalized to the "corresponding integrals". This is a standard expression that means that distributions are normalized in a way that the integral under the curve is equal to 1 (after the normalization).

11. p.9 lines 567-568 Replace the text "The binning size...Q^2 bins" as:

    The binning over the final hadron variables is listed in Table I. It was chosen as compromise between the minimal bin size over kinematics variables and affordable statistical accuracy.
    The sentence was changed to "It was chosen to maintain reasonable statistical uncertainties of the single-differential cross sections for all W and Q^2 bins."

12. Despite all my efforts, I was unable to understand the text between lines 597-609 in p.10. If possible, please write it in more clear form.
    This paragraph was refined multiple times during the analysis note and paper preparation and reviews. As a result this comprehensive explanation was achieved. The paragraph looks well-written to us.

13. p.11 lines 683-691.

    As it is written, the paragraph is contradictory. If GENEV is using phase space, it does not use the JM05 model. I guess, $\pi^+\pi^-p$ channel was simulated within JM05, while for three-pion background the phase space was used. Please, rephrase the paragraph making it self-consistent.
    This is exactly what is written there.

14. p. 12.n I strongly recommend to replace empty cells → blinded cells

    or any other English word differentiating the cells of zero acceptance from empty not populated by the measured events cells.
    We prefer to keep this notation. The definition of empty cells is clearly written in the fourth paragraph of section D.

15. Better to present the summary Table of systematic uncertainties similar as done in Ref [6].
    We think that the Section "Systematic uncertainties" clearly explains the subject in a way it is written now.

Comments by D. Ireland

Dear Gleb, et al.,
I have just a few comments on the draft paper, which looks to be in good shape:

1. line 24: referencing the CLAS technical paper is better left to the experimental section; it is more important to reference some physics results, such as the previous measurements that are described.
   We refer to the CLAS detector at the place, where it is firstly mentioned. The references to the previous measurements are given in the introduction as well.

2. lines 34-37: again, these sentences belong in the experimental section.
   Here (as it is common for an introduction) we introduce to a reader the focus of the paper thus providing some general statements concerning the data analysis and obtained results.

3. figure 15: This figure is a little confusing. Is it not enough to simply state that cells with $\delta\epsilon/\epsilon$ greater than 0.3 were not included because of concern over statistical accuracy?
   The cut on $\delta\mathcal{E}/\mathcal{E}$ is a new feature of this analysis that was not used in the previous studies (we refer to them in the text). Beside that, the chosen position of this cut affects the amount of the empty cells and, therefore, alters the model dependence of the results. Thus it is extremely important to provide all the details of this procedure.

4. line 799-802: I am not sure that, just because an approach for describing radiative processes in exclusive double-pion electroproduction is not available, it follows that a simpler assumption is adequate.

   Some re-wording maybe better, what about "The latter assumption is necessary, since approaches that are capable of describing radiative processes in double-pion electroproduction are not yet available."
   The word "adequate" here is used in the meaning "satisfactory or acceptable in quality for our needs". Beside that, the following sentence given in this section justifies the applicability of the procedure. "However, the need to integrate the cross section at least over four hadronic variables (see Eq. (13)) considerably reduces the influence of the final state hadron kinematics on the radiative correction factor, thus justifying the applicability of the procedure".