

Review of: "Numerical Evaluation of a Soliton Pair with Long Range Interaction"

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Potential competing interests: No potential competing interests to declare.

QEIOS

Manuscript title: Numerical Evaluation of a Soliton Pair with Long Range Interaction

In this study authors determine the interaction energy of electric or magnetic monopole pairs, sources and sinks of a Coulombic field. The monopoles are represented by topological solitons of finite size and mass, described by a field of $SO(3)$ rotations without any divergences. Such monopoles feel

at large distances a pure Coulombic interaction. A crucial test for the physical interpretation of these monopoles is a classical running of the charge at small distances, expected from the finite soliton size. We investigate in detail a first observation of the increase of the effective charge at a few soliton radii in this purely Coulombic system and compare it with the running of the coupling in perturbative QED.

While the paper is promising, with novel and attractive results, it is recommended for publication after making some necessary modifications.

- Please refrain from using abbreviations in the abstract. In fact, the acronym 'QED' was not introduced in the Introduction.
- The abstract should be extended and written more appropriately.
- Throughout the entire paper, there are some grammatical errors that should be minutely corrected.
- Several things need to be corrected in writing. Writing in English should be significantly improved.
- There are some punctuation errors. The authors are suggested to review the whole paper from the point of view of punctuation very carefully.
- Authors are encouraged to enhance the section introduction by incorporating additional references and relevant data to provide a more comprehensive overview. I suggest the following papers to improve the introduction and reference list.

1. <https://doi.org/10.1016/j.ijleo.2023.171438>
2. <https://doi.org/10.3390/fractalfract7020102>
3. doi: 10.3934/math.2023517
4. <https://doi.org/10.1016/j.rinp.2023.107116>
5. <https://doi.org/10.1016/j.aej.2023.03.023>

6. <https://doi.org/10.3390/fractalfract7020138>

- Authors are advised to carefully review Eq. 3.1 as there appears to be a mistake in it.
- Authors are advised to thoroughly review the entire manuscript for uniformity, as there are inconsistencies such as the use of numerical digits for equation numbers in some sections and alphabet characters in others.
- I didn't see a graphical explanation in the manuscript. Authors are advised to provide explanations for each figure. This additional information will contribute to a clearer understanding of the visual data and enhance the impact of the research.
- Please review Eq. A.9 as there appears to be an error.
- The satisfaction with the 3D graphs is lacking; therefore, authors are recommended to draw more 3D graphs of the obtained solutions.
- Including a more detailed graphical discussion will enhance the overall presentation of the research findings.
- The conclusion section should be extended and written more appropriately.
- Kindly check the parameter values for all sets of figures. Recheck and modify them.

This manuscript is recommended to be accepted only after making all the corrections and suggestions mentioned above.