Review of: "Propagation of electromagnetic waves through complex space for astronomical redshift investigation"

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Potential competing interests: No potential competing interests to declare.

Propagation of electromagnetic waves through complex space for astronomical redshift
investigation

Space has a complex structure, and investigations of any electromagnetic wave transmission theory need to consider the inhomogeneous and anisotropic nature. Two cases have been studied numerically: regions of pulse energy changes and gravitational deflection. Numerical methods have been developed, and examples given to show that these conditions do have their localized effects. But, since the total length of those regions is insignificant in comparison with the total transmission distance involved, their inclusion does not significantly alter the linear relationship between wavelength change and distance travelled. The possible exception is the case of gravitational deflection when the waves have passed through densely populated regions of space. The manuscript could be of interest in the current debate on Hubble tension.

The paper is well organized, and I recommend its consideration for publication if the following points are addressed.

1-The author uses ‘we’ throughout the manuscript, while the section related to the author's names shows only one author. Are there some authors that are not included in the manuscript?

2-The literature review is essentially based on authors' past works. The author should update this section by including the different solution methods that have been used to solve the NSE as well as the limits of the methods developed in the literature. As an example, the LBM has been used to solve the non-linear convection-diffusion equations such as the NSE, the Sine-Gordon equation, etc., in a complex space.

See: B. Shi, Z. Guo, Lattice Boltzmann model for nonlinear convection-diffusion equations, Phys. Rev. 79 (2009), 016701

3- In the whole manuscript, including figures and tables, please specify the unit of distance$x$, time t, energy E, total distance Z, dispersion coefficient D, and constant C

4-In Eq.(4), specify the components of matrices A, L, and Q, and present the limits of the present work

5-The author talks about the redshift, which concerns the wavelength, while the NSE presented in Eq. (1) does not show variation with the wavelength. Explain clearly in the manuscript how the wavelength is modified in the redshift using the solution of the NSE.

6-In Eq.(5), check the dimensions of the term $t - 0.5L$ since t is the time and L is the distance

7-The paper solves the 1D NSE and claims that the redshift was predicted, while no issues were proposed to solve the multidimensional NSE. Considering the multidimensional NSE, are the conclusions drawn in this manuscript still valid?

8-In example 3, the case S(x) = s u(x) has been considered. So, Eq.(1a) should be generally presented for S#0

9-The values attributed to the governing parameters in Tables 1 and 2, and examples 1-4, are they related to a physical phenomenon observed in the field? Justify the choice of the different parameters in each example.