

Comments on the manuscript#MS:2012 PRRI 2773, "Application of Non-local Quantum Hydrodynamics to" by Alexeev and Ovchinnikova

This manuscript addresses the motion of the charged particles in graphene by employing the quantum non-local hydrodynamic description. It is an addition to the previous work mostly done by the first author of the paper [many refs. given] which deals mainly with non-local physics. The manuscript is focused to the title under study, the mathematical modelling is seemingly appropriate and the results (with respect to the model under study) are original and admittedly interesting. Therefore, it is suggested that, the manuscript may be suitable for publication, provided the following main points are taken into account.

1. The authors use the non-dimensional, non-local quantum hydrodynamics/generalized hydrodynamics equations to describe the charge density waves (CDWs)/solitons dynamics in graphene. It is suggested that the model should be given in dimensional form in the beginning. It will then be easy for the readers to conceive the relevant scales of the model.
2. The existence and characteristics/conditions of solitons in graphene needs to be elaborated.
3. The authors describe the inability of the Madelung hydrodynamics for such problems due to destruction of the wave packets. Some detail is required on the differences between the Madelung approach and the present one. Does the quantum potential as in the Madelung hydrodynamics has no role here?
4. Quantum electron pressure is given by $p_{\{e\}} = p_0 V_{\{0e\}}^2 p_{\{e\}}$. If the temperature T is not too large, the electron Fermi energy should have a role here which is not discussed. It also makes the Thomas-Fermi length scale relevant to shielding distances. The authors should point out why these aspects are not important in non-local description.
5. The role of chirality and correlations in low temperature single layered graphene is notable (e.g., see Y. Barlas et. al., Phys. Rev. Lett. 98, 236601 (2007)). The authors should justify the neglect of such effects in their model.
6. The presentation of the manuscript is weak. Particularly, formatting (typos) and grammar is needed to be checked carefully on many places. The authors should consult a native English speaker in this regard. In addition, the figure captions are not well written and seemingly ambiguous on some places which need clarity.
7. While applying the results to graphene, the authors use typical parameters. For example, on page 14-15. Some standard reference(s) needed here to justify the worth of the data.

The revision of the manuscript in the light of the report can make it appropriate for publication in PRRI.....END

Note: Anonymous Reviewer