PI Zoubi

This is an interesting draft proposal with potentially important significance across many scientific fields. It is dense with information and challenging to edit without altering the intent. I also made suggestions about organization that I hope are useful as you develop the proposal.

Overall comments

1. I tried to compact the writing where possible to provide economize on space for the full proposal. Please read the compiled version carefully to be sure I have not altered any of the writing intent.

2. In the Abstract, Background, and Contributions and Preliminary Results sections, I suggest striving to use present tense “is”, rather than past “was” or passive “has been”. Published work, including your own, is generally written in the present tense and presented as established facts. Results of unpublished research can be presented in past tense. This suggestion will save space and improve the reading flow. Past and passive are used extensively in the proposal. I edited where possible. You will note these edits in the margins.

3. I strongly suggest numbering your sections, headings, and subheading. This will help reviewers organize the proposal as they read and will make it easier to refer to prior sections. Numbered sections will also permit you to guide reviewers to specific sections within the proposal.

4. I suggest avoiding, where possible, equivocal words like some, few, several, etc. This includes non-quantified words like long and small. For example, a “long cm-scale nanowire”. Can this be quantified as a value or value range at the first instance? This will eliminate a source of reviewer questions, especially if they are not specialists.

5. To save space, I suggest altering your template parameters such that there is only a single space between sentences rather than two.

6. Research Objectives and Expected Significance.

a. You may wish to consider the value of placing some of the significant challenges to the proposal Prior to the Detailed Description and Working Hypotheses section. I suggest that it seems apologetic and communicates to reviewers that you are unsure of the research objectives and plans. While I appreciate that you are addressing criticism to anticipate reviewer comments, I suggest that it may be advisable to present these issues in the Pitfalls section later. These points can also be raised at appropriate sections within the research plan and referred to the Pitfalls section. You can also present alternative plans should any aspect of the proposal fail within the research plan section. I suggest that these strategies will address reviewer concerns as they occur during the proposal without being apologetic. I hope this helps!

b. I suggest in this section taking more space to outline your research objectives, rather than pitfalls. Also, it may be helpful to add additional details or examples to your expected significance statement. Quantum computing is of huge significance, but are there other applications? Are there uses that are valuable if you don’t achieve all your research goals? This can minimize perceived risk by reviewers.

c. I suggest numbering the Aims and providing a two or three sentence description below that states briefly how each aim will be achieved experimentally and what each aim contributes toward your main goals. This will provide reviewers summary of your research plan and how it is organized. This is useful because reviewers can refer to the list of Aims to orient themselves when reading the detailed research plan.

d. Also, perhaps reducing the number or combining some of the aims will reduce the complexity for reviewers. I suggest having no more than four aims unless it is necessary. For example, is finding useful applications of phonon states a specific research aim with associated experiments or a longer-term objective if the proposal is successful?

7. Detailed Description and Working Hypothesis.

a. I suggest being more specific when referring to sections of the proposal. For example, it would be clearer for reviewers if you reference specific numbered aims or other proposal section. In this case, I suggest referring to specific Aim 1 or Aims 1 and 2, for example.

b. As written, the section does not present any hypotheses. This will be critical to the proposal which should be hypothesis-driven with one or more specific experimental aims designed to address the hypothesis. For example, “We hypothesize that thermal phonons result in Brillouin scattering”. This is a naive experimentally, but I suggest restating the approaches presented as hypotheses to be addressed by your specific aims.

c. As a friendly reviewer, I find the organization suggested by ISF be a bit odd. As long as you have all the required elements, it may make sense to organize differently. For example, your hypotheses could be placed after Research Objectives and Expected Significance as follows:

- Research Objectives and Expected Significance

- Working Hypotheses

- Specific Aims

This organization permits the hypotheses to precede the aims, you can logically describe how the aims relate to the hypotheses. Ideally, the proposal should flow logically from section to section without raising technical or organizational questions. Well-organized proposals are much easier to read and review, and reviewers are more likely to be positive toward a proposal they can follow and understand. I hope this helps.

d. In the Thermal Noise and Phonon Lifetime and Phono Fock’s and Coherent States sections, I strongly suggest connecting your proposed research Aims to the proposed research. Again, the idea is for reviewers to understand explicitly how each aspect of the research plan addresses the Specific Aims. The Specific Aims, in turn, tell reviewers how you will address each of the hypotheses presented. In this way, all the sections support one another in presenting a streamlined and organized plan.

8. The Research Design and Methods section is concise and reads well!