

I thank the Reviewers again for reading this manuscript and providing helpful feedback. At this stage only Reviewer 2 had further suggestions for modifications.

Reviewer 2 Comment 1: A final concern regards the widely revised Sec. 4, as it is quite extensive and deals both with the state of the art and with the approach proposed by the Author. Probably the latter could be worth a separate section or could be included within the current Sec. 3. Additionally, the considerations about the state of the art could be placed after Sec. 2.

Response: I understand the reviewer's point. One could restructure this manuscript so that the survey of the field takes place before the description of our proposed approach. After careful consideration, I would rather not make this modification. My reasoning is as follows. In Secs. 1 and 2 I describe the conceptual motivations for this work, leveraging insights from VLSI circuits and neuroscience. I then move to Sec. 3, where hardware that makes use of these insights is introduced. From there I go to Sec. 4 where other related work in the field is surveyed. In Sec. 4, I compare and contrast the hardware introduced in Sec. 3 with other approaches under development. If I make the suggested changes, this compare/contrast section will occur before I have thoroughly introduced the hardware proposed by our group. My concern is that the reader at that point will not have a sufficiently clear picture of what we are proposing, so the differences between our approach and related work will not be apparent.

Regarding the suggestion to break Sec. 4 into two sections, I think this would essentially involve making what is now Sec. 4.4 its own section. I do understand the reviewer's reasoning here. Section 4.4 is not a survey of other existing work, but rather a consideration of another hypothetical approach that deserves attention, although it is not, to our knowledge, under investigation at this time. Still, I would prefer to leave Sec. 4.4 in its current location as a subsection. It presently resides in the section entitled "The landscape of research in photonic and superconducting neural systems," and I believe the content of that subsection properly falls under this heading. One of my objectives in writing this article was to keep it as brief as possible, and I think that by adding a new section, even without adding additional content, the article will feel longer and more cumbersome. I hope the reviewer can support this decision.

In addition to the above considerations, I needed to make two small adjustments. First, since submitting the prior version of the manuscript, I noticed a small error in Fig. 1. I have updated this figure with minute changes that would not be noticeable to any but the most discerning reader. The minute changes to Fig. 1 required changing the word "one" to "**several**" and adding "**over one hundred thousand**" to the text on pg. 3. This change makes no difference to the argument of that section or the paper as a whole, but I could not go forth in good conscience without correcting this minor error.

The second small adjustment is the addition of one more reference (Ref. 102) that I discovered a few days ago. Again, the inclusion of this reference makes no difference to the argument of the article, but it did not feel right to cite a paper from an American group without citing a similar paper from a Japanese group once I became aware of the latter. I hope the editors can allow these small changes in the interest of accuracy and completion.

Finally, I expressed my appreciation for the reviewer's contributions in the acknowledgements section: "**I also thank three reviewers for valuable feedback.**"