

November 7, 2023

Dear Editors:

We thank you for your time and for sending the manuscript for review; however, there is an issue we would like to bring to your attention. In the cover letter we specifically recommended “not relying exclusively on reviewers who would focus primarily on the mathematical aspects" because "the core new idea is to look for physical justification of the mathematical structure, not simply internal mathematical consistency." However, both reviewers did exactly that, and, as predicted, "missed the main point of the paper."

For example, one reviewer states, "The obvious criticism of this point of view is that exactly the same issue arises in probability theory." This implies that all objects in a physical theory that use probability have the same requirements. This is, obviously, not true. The description of a pure state of a system, which is something that is physically realized at one point in time, is different than, say, an agent credence, which is never really instantiated physically, or the probability of an outcome, as only one outcome is instantiated at a time. An infinite expectation on the latter two presents no issue, because the infinity is never instantiated in a single moment. It is, however, a problem for the state.

As another example, the other reviewer states, "a reference discussing the equivalence of both concepts [unitary transformation and change of variable] would benefit the reader." First of all, in Proposition 24 we do provide exactly the link between change of variables and unitary transformations. But the fact that the reviewer does not know this link means he has never thought about how change of frame, a key concept in relativity and all of physics, is implemented in the framework of quantum mechanics. How can the reviewer be in a position to understand the details of how physical requirements are mapped to the mathematical requirements?

We are particularly saddened because this is exactly the reason why we do not have a solid mathematical foundation for our physical theories. On one hand, we have people that are very well versed in math, but who have very little understanding of the physical significance of that math. On the other hand, we have people that are very well versed in the physics, but who are ignorant of the mathematical details or, even worse, flaunt the fact they do not care about such details (e.g. how path integrals in QFT are not mathematically well defined). No significant progress can be made if even when people try to do the due diligence, they get rejected by one of those two camps.

We hope that, at least in the future, when an author specifically asks for reviewers that focus on the physical argument, and the reviews clearly focus only on the mathematical aspects, you will recognize that they cannot be the basis of an appropriate evaluation of the merit of the paper.

Sincerely,

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