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November 28, 2015

Physical Review X Editorial Office

Dear Madam/Sir,

We are pleased to submit for your consideration our dual theoretical/experimental paper, *Realizing Chiral Quantum Walks*. In this article, we report about our finding on how breaking time-reversal symmetry (so that a quantum particle traveling backwards in time can be discerned from one traveling forwards) provides a new handle to control quantum systems.

Due to the application-centric focus of our study (contrasting this with a long interest regarding time-asymmetry in fundamental physics), we feel that our findings are of significant interest to the broader physics audience. Our work puts forth a modern account of time-asymmetry theory using the techniques from quantum information and transport science. The theory we developed in our work allowed us to pinpoint a meaningful fundamental (and first) demonstration, illustrating how the effect can now be used in practice.

Our manuscript also includes a precise classification of the effect's strong dependence on the global topology of the underlying network of the quantum system. Intriguingly, we found that the effect is present in many but not all of the typical quantum circuits/algorithms/protocols used across the field of quantum information science.

We suggest the following list of experts to serve as impartial referees as each of them is a leading scientist the fields that we expect to have strong impact in:

- Prof. Vlatko Vedral (Oxford University and NUS Singapore — quantum transport and condensed matter), vlatko.vedral@qubit.org
- Prof. XY
- Prof. Diogo O. Soares-Pinto (University of Sao Paulo — both NMR and stochastic processes), dosp@ifsc.usp.br

With best regards
on behalf of all authors,

Jonathan Baugh