

# Broken Quantum Classical Correspondence in Quasi-Static Protocols

D COHEN<sup>1</sup>

<sup>1</sup>*Department of Physics, Ben Gurion University of the Negev, Beer-Sheva, Israel*  
Contact Email: dcohen@bgu.ac.il

Quantum mechanically, a driving process is expected to be reversible in the quasistatic limit, aka adiabatic theorem. This statement stands in opposition to classical mechanics, where mix of regular and chaotic dynamics implies irreversibility. We discuss prototype protocols where this observation has a practical implications: many-body adiabatic passage along Bose-Hubbard chains [1]; and an atomtronic superfluid ring whose rotation velocity is gradually varied [2]. The conditions for breakdown of quantum-to-classical correspondence are highlighted.

## References

- [1] A V Varma, A Vardi and D Cohen, Phys. Rev. Lett. **134**, 053201 (2025)
- [2] Y Winsten and D Cohen, Phys. Rev. A **107**, 052202 (2023)