

# Information Lattice picture for the Fisher-Information indicators

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#### 1. Introduction

### 2. Information Lattice

Building on the works in [Bardarson2022TimeEvolutionSciPostPhys] The Information Lattice as a concept to systematically analyze the information content and entanglement structure of a quantum many-body state was first introduced by Artiaco et. al. in [1], and further developed as a tool for dynamics, charecterisation of loclisation, rate of information scrambling, criticality of the localisation-scrambling transition, and quench dynamics respectively in [1–4]. Here for the sake of completeness, we quote the construction of information lattice and some properties possibily useful to us from the aforementioned works.

## 3. Insigts from Information Lattice calculations

#### References

- <sup>1</sup>C. Artiaco, C. Fleckenstein, D. Aceituno Chávez, T. K. Kvorning, and J. H. Bardarson, "Efficient large-scale many-body quantum dynamics via local-information time evolution", PRX Quantum 5, 020352 (2024) 10.1103/PRXQuantum.5.020352, arXiv:2312.00141 [quant-ph].
- <sup>2</sup>D. Aceituno Chávez, C. Artiaco, T. Klein Kvorning, L. Herviou, and J. H. Bardarson, "Ultraslow growth of number entropy in an ℓ-bit model of many-body localization", Phys. Rev. Lett. **133**, 126502 (2024) 10.1103/PhysRevLett.133.126502, arXiv:2403.02418 [cond-mat.dis-nn].
- <sup>3</sup>C. Artiaco, T. Klein Kvorning, D. Aceituno Chávez, L. Herviou, and J. H. Bardarson, "Universal characterization of quantum many-body states through local information", Phys. Rev. Lett. **134**, 190401 (2025) 10.1103/PhysRevLett.134.190401, arXiv:2501.09090 [cond-mat.str-el].
- <sup>4</sup>N. P. Bauer, B. Trauzettel, T. Klein Kvorning, J. H. Bardarson, and C. Artiaco, "Local information flow in quantum quench dynamics", Phys. Rev. A **112**, 022221 (2025) 10.1103/PhysRevA.112.022221, arXiv:2502.14572 [quant-ph].

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