Time-resolved Stochastic Dynamics of Quantum Thermal Machines

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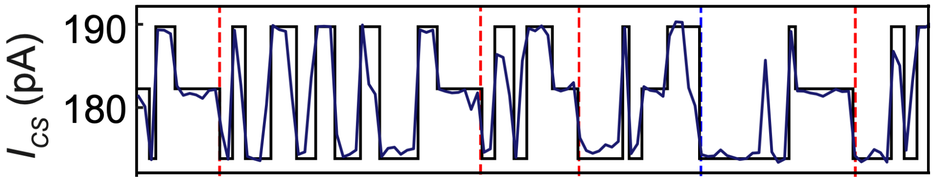
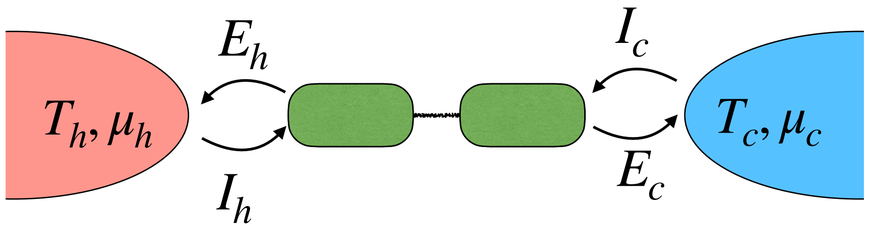
arXiv:2408.00694
(to appear in PRL)



Vivek Wadhia, *et. al.* arXiv 2502.00096

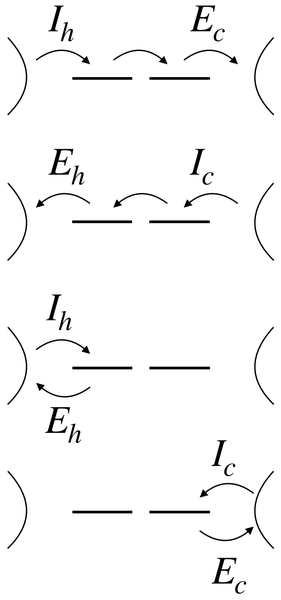


Quantum trajectory:
list of symbols (plus time tags)

$\ldots I_h E_c I_c I_h E_h E_c I_h I_c E_h I_c \ldots$ General case

$\ldots I.E.I.E.I.E.I.E.I.E.\ldots$ Single excitation case

Th: single excitations



Engine: $X = 1$

Refrigerator: $X = 2$

Hot bounce: $X = 3$

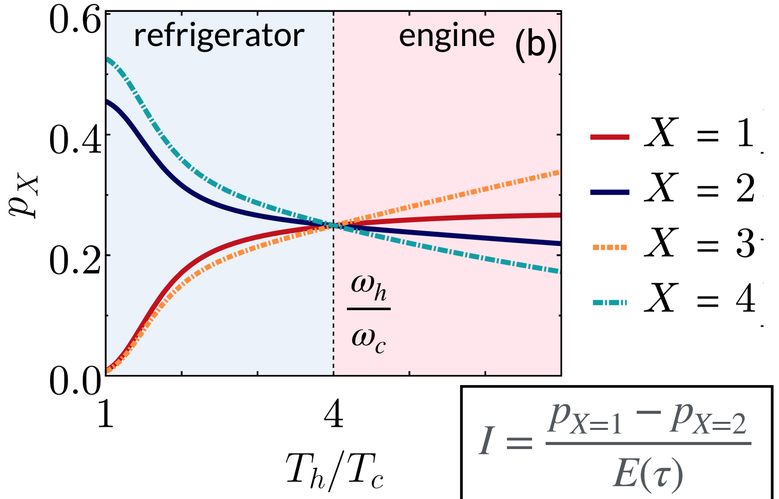
Cold bounce: $X = 4$

New questions:

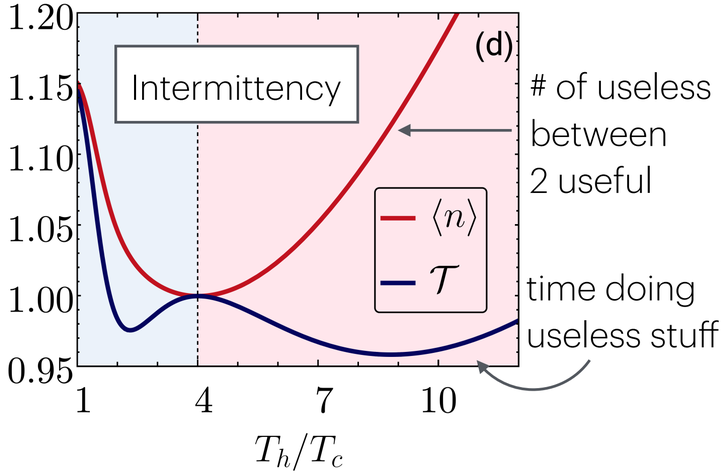
- Probability cycle is of type X?
- Entropy production of each cycle?
- How long does a cycle take? **Waiting time distribution**.
- How are cycles correlated with each other? **Cycle bunching/anti-bunching.**
- How many bounces between something useful? **Intermittency.**

$$\frac{d\rho}{dt} = -i[H,\rho] + \sum_n D[K_n]\rho$$

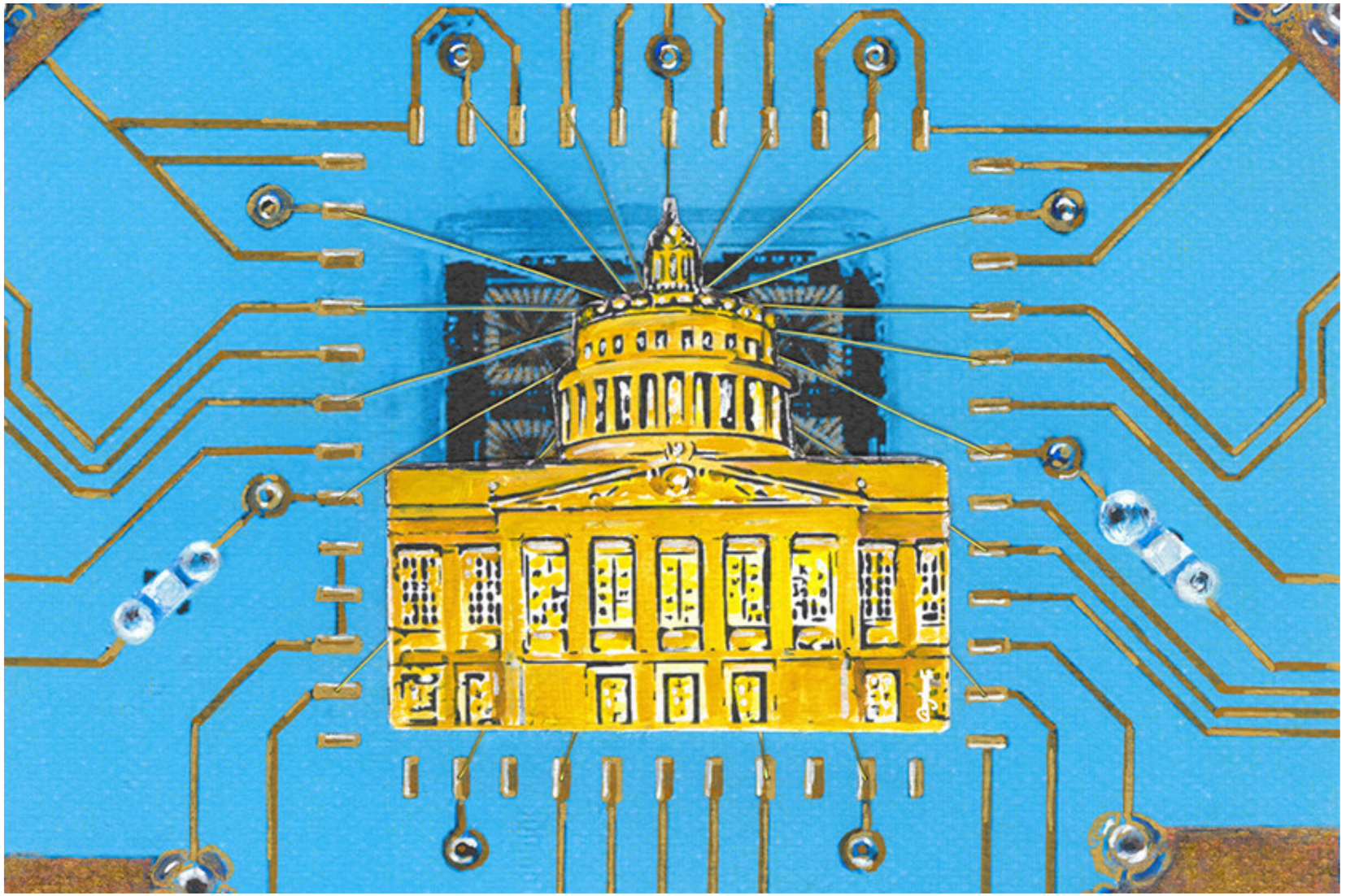
$$+ \sum_{\alpha\in\{h,c\}} \sum_j \gamma^-_{\alpha j} D[L_{\alpha j}]\rho + \gamma^+_{\alpha j} D[L^\dagger_{\alpha j}]\rho$$



$$I = \frac{p_{X=1} - p_{X=2}}{E(\tau)}$$



12th Rochester Conference on Coherence and Quantum Science (CQS-12)



June 23-27, 2025 Rochester NY

Founded by Prof. Mandel & Prof. Wolf
CQS dates back to 1960 and has brought together Nobel Laureates & field pioneers.

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Aziza Suleymanzade
Chris Monroe
Nicole Yunger-Halpern
Alexandre Blais
Julian Kelly
Zlatko Minev
Sophia Barnes
John Martinis
And many more…

Registration Open now!
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https://www.sas.rochester.edu/quantum/cqs/information.html