DAMOP18-2018-020010

Abstract for an Invited Paper
for the DAMOP18 Meeting of
the American Physical Society

Quantum fluctuation theorems go Quantum Computers[1]

SEBASTIAN DEFFNER, UMBC

Near term quantum hardware promises unprecedented computational advantage. Crucial in its development is the characterization and minimization of computational errors. We will review recent developments in informational quantum fluctuation theorems and propose the use of them to characterize the performance of quantum annealers. We will see that this versatile tool provides simple means to determine whether the quantum dynamics are unital, unitary, and adiabatic, or whether the system is prone to thermal noise. Our proposal was experimentally tested on two generations of the DWave machine, which illustrates the sensitivity of the fluctuation theorem to the smallest aberrations from ideal annealing.

References:

[1] Kafri and Deffner, Phys. Rev. A **86**, 044302 (2012)

[2] Gardas and Deffner, arXiv:1801.06925

[1]SD acknowledges support by the U.S. National Science Foundation under Grant No. CHE-1648973.