Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Algorithmic cooling of a many-body system. ZHI-HUI WANG, MELINA FILZINGER, YUE SHI, FRANK MOSCATELLI, JIEHANG ZHANG, New York University — Computers, quantum and classical alike, require an initialization to a state with high purity prior to performing any computation task. This operation reduces information entropy to nearly zero, which can be achieved by either shifting charges in a classical transistor, or by optically pumping individual atoms to initialize an atomic quantum computer. In both cases the entropy is removed by coupling to an effective external bath. An alternative method is to gain information, compute the direction to minimize entropy, and perform feedback operations. We show this algorithmic cooling in an example many-body system: ions in a charged particle trap. This technique can be readily applied to different many-body systems as it is agnostic to the trapped particle species.

Jiehang Zhang
New York University

Date submitted: 01 Feb 2019 Electronic form version 1.4