

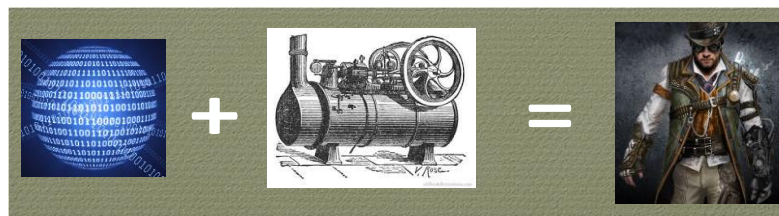


CLARK UNIVERSITY DEPARTMENT OF PHYSICS COLLOQUIUM

Nicole Yunger Halpern
Harvard-Smithsonian ITAMP
(Institute for Theoretical Atomic, Molecular, and Optical Physics)
Harvard University Department of Physics

“Quantum steampunk: Quantum information meets thermodynamics”

Abstract: Thermodynamics has shed light on engines, efficiency, and time’s arrow since the Industrial Revolution. But the steam engines that powered the Industrial Revolution were large and classical. Much of today’s technology and experiments are small-scale, quantum, and out-of-equilibrium. Nineteenth-century thermodynamics requires updating for the 21st century. Guidance has come from the mathematical toolkit of quantum information theory. Applying quantum information theory to thermodynamics sheds light on fundamental questions (e.g., how does entanglement spread during quantum thermalization? How can we distinguish quantum heat from quantum work?) and practicalities (e.g., nanoscale engines and the thermodynamic value of quantum coherences). I will overview how quantum information theory is being used to modernize thermodynamics for quantum-information-processing technologies. I call this combination **quantum steampunk**, after the steampunk genre of literature, art, and cinema that juxtaposes futuristic technologies with 19th-century settings.



Wednesday, October 2, 2019

12:00 pm - Room S-122, Sackler Sciences Center