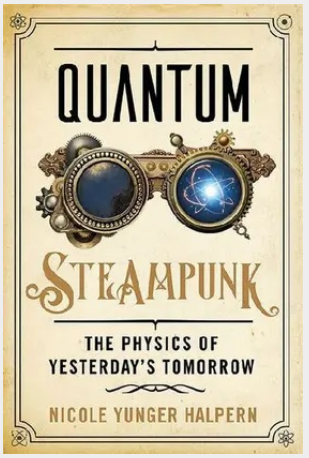
Yunger Halpern

# Quantum Steampunk

The Physics of Yesterday's Tomorrow

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The Industrial Revolution meets the quantum-technology revolution! A steampunk adventure guide to how mind-blowing quantum physics is transforming our understanding of information and energy. Winner of the PROSE Award for Best Book in Popular Science and Popular Mathematics by the Association of American Publishers, Shortlisted for the Phi Beta Award in Science by the Phi Beta Kappa Society Victorian era steam engines and particle physics may seem worlds (as well as centuries) apart, yet a new branch of science, quantum thermodynamics, reenvisions the scientific underpinnings of the Industrial Revolution through the lens of today's roaring quantum information revolution. Classical thermodynamics, understood as the study of engines, energy, and efficiency, needs reimagining to take advantage of quantum mechanics, the basic framework that explores the nature of reality by peering at minute matters, down to the momentum of a single particle. In her exciting new book, intrepid Harvard-trained physicist Dr. Nicole Yunger Halpern introduces these concepts to the uninitiated with what she calls "quantum steampunk," after the fantastical genre that pairs futuristic technologies with Victorian sensibilities. While readers follow the adventures of a rag-tag steampunk crew on trains, dirigibles, and automobiles, they explore questions such as, "Can quantum physics revolutionize engines?" and "What deeper secrets can quantum information reveal about the trajectory of time?" Yunger Halpern also describes her own adventures in the quantum universe and provides an insider's look at the work of the scientists obsessed with its technological promise. Moving from fundamental physics to cutting-edge experimental applications, Quantum Steampunk explores the field's aesthetic, shares its whimsy, and gazes into the potential of a quantum future. The result is a blast for fans of science, science fiction, and fantasy.

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