1.	Record Nr.	UNINA9910300535803321
	Autore	Montangero Simone
	Titolo	Introduction to Tensor Network Methods : Numerical simulations of low-dimensional many-body quantum systems / / by Simone Montangero
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
	ISBN	3-030-01409-6
	Edizione	[1st ed. 2018.]
	Descrizione fisica	1 online resource (172 pages)
	Disciplina	530.12
	Soggetti	Physics
		Quantum theory
		Quantum computers
		Mathematical physics
		Numerical and Computational Physics, Simulation
		Quantum Physics
		Quantum Computing
		Mathematical Applications in the Physical Sciences
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Introduction -- Part I: Software and Hardware -- Lesson 1: Computer for Physicists -- Lesson 2: Software for Physicists -- Part II: Crash Programming Course -- Lesson 3: Fortran -- Lesson 4: Python -- Lesson 5: Gnuplot -- Part III: Single-Body Problem -- Lesson 6: Matrix Diagonalization -- Lesson 7: Integrals -- Lesson 8: Differential Equations -- Part IV: Many-Body Problem -- Lesson 9: Monte Carlo -- Lesson 10: Renormalization Group -- Lesson 11: Tensor Networks -- Part V: Symmetries -- Lesson 12: Group Theory -- Lesson 13: Quantum Phase Transitions -- Lesson 14: Global Symmetries -- Lesson 15: Gauge Theories. .
	Sommario/riassunto	This volume of lecture notes briefly introduces the basic concepts needed in any computational physics course: software and hardware, programming skills, linear algebra, and differential calculus. It then presents more advanced numerical methods to tackle the quantum

many-body problem: it reviews the numerical renormalization group and then focuses on tensor network methods, from basic concepts to gauge invariant ones. Finally, in the last part, the author presents some applications of tensor network methods to equilibrium and out-of-equilibrium correlated quantum matter. The book can be used for a graduate computational physics course. After successfully completing such a course, a student should be able to write a tensor network program and can begin to explore the physics of many-body quantum systems. The book can also serve as a reference for researchers working or starting out in the field. .