1. Record Nr. UNINA9910788092203321

Titolo	Atom interferometry : proceedings of the International School of Physics "Enrico Fermi", course 188, Varenna on Lake Como, Villa Monastero, 15-20 July 2013 / / edited by G. M. Tino and M. A. Kasevich
Pubbl/distr/stampa	Amsterdam, Netherlands : , : IOS Press, , 2014 ©2014
ISBN	1-61499-448-X
Descrizione fisica	1 online resource (807 p.)
Collana	Italian Physical Society, , 1879-8195 ; ; Course 188
Disciplina	535.4
Soggetti	Interferometry Interferometers Atoms - Optical properties
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	""Title Page""; ""Contents""; ""Preface""; ""Course group shot""; ""Interferometry with atoms""; ""Optics and interferometry with atoms: an introduction""; ""Basics of matter wave optics""; ""The wave equations""; ""Dispersion relations""; ""Phase and group velocity""; ""Path integral formulation""; ""JWKB approximation""; ""Eikonal approximation""; ""Coherence""; ""Spatial coherence""; ""Coherence in momentum space""; ""Higher-order coherence""; ""Index of refraction for matter waves""; ""Index of refraction caused by a classical potential""; ""Index of refraction from scattering"" ""Optics and interferometry using gratings""""Diffraction""; ""Diffraction in space""; ""Diffraction from nano-fabricated structures""; ""Light gratings from standing waves""; ""Diffraction in time""; ""Interferometers""; ""Three-grating Mach-Zehnder interferometer""; ""Selected experiments with beam interferometers""; ""Einstein's recoiling slit: a single photon as a coherent beamsplitter""; ""Interferometry with Bose-Einstein condensates in double-well potentials""; ""A Bose-Einstein condensate in a double-well potential: a simple model""; ""Single-particle approach"" ""Two-mode approximation""""Rabi dynamics""; ""Splitting""; ""Time-of-flight recombination""; ""In-trap recombination""; ""Phase shifts"";

	""Effect of interactions: Josephson dynamics, squeezing, and dephasing""; ""Bose-Hubbard model with two sites""; ""Mean-field treatment""; ""Fluctuations and interferometry""; ""Squeezing during splitting""; ""Phase diffusion""; ""Effective single-particle Hamiltonian""; ""Probing many-body physics by interference""; ""Interference of 1D Bose gases""; ""The 1D Bose gas""; ""Multi-mode interference""; ""Pairs of 1D Bose gases in equilibrium"" ""Theoretical description""""Measurement of the matter wave interference contrast""; ""Probing relaxation in non-equilibrium 1D Bose gases""; ""Coherent splitting of a 1D Bose gas""; ""Dynamics of the matter wave interference contrast""; ""Prethermalization""; ""Light-cone-like emergence of thermal correlations""; ""Matter wave interferometry with composite quantum objects""; ""Introduction and outline""; ""Concepts and tools of coherent nanoparticle manipulation""; ""Coherence preparation""; ""Far-field diffraction at a nanomechanical grating""; ""Optical gratings"" ""Measurement-induced absorptive gratings""""Optical phase gratings""; ""Matter wave interferometry in the time domain""; ""From far-field to near-field diffraction and near-field interferometry""; ""A unified phase-space description of three-grating matter wave interferometry""; ""The Wigner function representation""; ""Grating diffraction in phase space""; ""Thin stationary gratings for fast particles""; ""Short ionizing grating pulses""; ""Classical pendant of the grating transformation""; ""The Talbot self-imaging effect""; ""Talbot-Lau interference in phase space"" ""Coherent description""
Sommario/riassunto	Since atom interferometers were first realized about 20 years ago, atom interferometry has had many applications in basic and applied science, and has been used to measure gravity acceleration, rotations and fundamental physical quantities with unprecedented precision. Future applications range from tests of general relativity to the development of next-generation inertial navigation systems. This book presents the lectures and notes from the Enrico Fermi school ""Atom Interferometry"", held in Varenna, Italy, in July 2013. The aim of the school was to cover basic experimental and theoretical