1. Record Nr. UNINA9910554855903321

Autore	Dahoo Pierre Richard
Titolo	Applications and metrology at nanometer scale 2 : measurement systems, quantum engineering and RBDO method / / Pierre Richard Dahoo, Philippe Pougnet, Abdelkhalak El Hami
Pubbl/distr/stampa	Hoboken, New Jersey ; ; London, England : , : John Wiley & Sons, Incorporated : , : ISTE Ltd., , [2021] ©2021
ISBN	1-119-81897-4 1-119-81896-6
Descrizione fisica	1 online resource (279 pages) : illustrations
Disciplina	389.1
Soggetti	Metrology Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Half-Title Page -- Title Page -- Copyright Page -- Contents -- Preface -- Introduction -- 1 Measurement Systems Using Polarized Light -- 1.1. Introduction -- 1.2. Matrix optics -- 1.3. Photon emission and detection -- 1.4. Application exercises on interferometry -- 1.4.1. Propagation of electromagnetic waves in a Fabry-Perot cavity -- 1.4.2. Propagation of electromagnetic waves in a material -- 1.4.3. Interferometry and optical lambda meter -- 1.4.4. The homodyne interferometer and refractometer -- 1.4.5. The heterodyne interferometer -- 1.4.6. Application exercises on ellipsometry -- 1.5. Appendices matrices -- 1.5.1. Conventions used for Jones vectors and Jones ABCD -- 1.5.2. 2×2 transfer dies -- 1.5.3. 2×2 matrix multiplication -- 1.5.4. Trigonometric forms -- 1.5.5. Solution by MATLAB (exercises 1.4.3, 1.4.4 and 1.4.5). -- 1.6. Conclusion -- 2 Quantum-scale Interaction -- 2.1. Introduction -- 2.2. The spin through the Dirac equation -- 2.2.1. Theoretical background -- 2.2.2. Application: the Dirac equation and Pauli matrices -- 2.3. The density matrix for a two-level laser system -- 2.3.1. Definition of the density matrix -- 2.3.2. Density matrix properties -- 2.3.3. Equation of motion of the density matrix -- 2.3.4. Application to a two-level system --

2.4. Ising's phenomenological model for cooperative effects -- 2.4.1. The Ising 1D model -- 3 Quantum Optics and Quantum Computers -- 3.1. Introduction -- 3.2. Polarized light in quantum mechanics -- 3.3. Introduction to quantum computers -- 3.4. Preparing a qubit -- 3.4.1. Application of the Bloch sphere -- 3.5. Application: interaction of a qubit with a classical field -- 3.5.1. Answer to question 1 -- 3.5.2. Answer to question 2 -- 3.6. Applying Ramsey fringes to evaluate the duration of phase coherence -- 3.6.1. Answer to question 1 -- 3.6.2. Answer to question 2.
4 Reliability-based Design Optimization of Structures -- 4.1. Introduction -- 4.2. Deterministic optimization -- 4.3. Reliability analysis -- 4.3.1. Optimal conditions -- 4.4. Reliability-based design optimization -- 4.4.1. The objective function -- 4.4.2. Taking into account the total cost -- 4.4.3. Design variables -- 4.4.4. Response of a system by RBDO -- 4.4.5. Limit states -- 4.4.6. Solving methods -- 4.5. Applications -- 4.5.1. Application on a bending beam -- 4.5.2. Application on a circular plate with different thicknesses -- 4.5.3. Application: hook A -- 4.5.4. Application: optimization of the materials of an electronic board -- 4.6. Reliability-based design optimization in nanotechnology -- 4.6.1. Thin-film SWCNT structures -- 4.6.2. Digital model of thin-film SWCNT structures -- 4.6.3. Numerical results -- 4.7. Conclusion -- Appendix: Short Overview of Quantum Mechanics -- References -- Index -- Other titles from iSTE in Mechanical Engineering and Solid Mechanics -- EULA.