1. Record Nr. UNINA9911031665403321

Autore	Thyagarajan Krishna
Titolo	Integrated Quantum Photonics / / by Krishna Thyagarajan
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2025
ISBN	3-031-85728-3
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (904 pages)
Collana	Graduate Texts in Physics, , 1868-4521
Disciplina	621.365
Soggetti	Optoelectronic devices Nanophotonics Plasmonics Quantum computing Photonics Optical engineering Telecommunication Solid state physics Optoelectronic Devices Nanophotonics and Plasmonics Quantum Information Photonics and Optical Engineering Microwaves, RF Engineering and Optical Communications Electronic Devices
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	1 Introduction -- 2 Quick Recall of Basic Electromagnetics -- 3 Quantum Mechanics -- 4 Modes in Optical Waveguides -- 5 The Optical Directional Coupler -- 6 Electro Optic Effect in Optical Waveguides -- 7 Waveguide Y splitters and Mach-Zehnder Interferometer -- 8 Optical Ring Resonators and Arrayed Waveguide Grating -- 9 Periodic Interactions in Waveguides -- 10 Nonlinear Optical Polarization -- 11 Second Harmonic Generation -- 12 Sum and Difference Frequency Generation -- 13 Optical Parametric Amplification -- 14 Quantization of the Electromagnetic Field and the Concept of Photon -- 15 Single Mode Photon States -- 16 Multimode Photon

States -- 17 Entangled Photon States -- 18 Squeezed Photon States -- 19 Beam Splitter -- 20 Optical Homodyning -- 21 Schrödinger, Heisenberg and Interaction Pictures -- 22 Quantum Treatment of Parametric Processes -- 23 Entangled Photon Pair Generation -- 24 Some Interesting Experiments in Quantum Photonics -- 25 Some Applications of Quantum Photonic Technology.

Sommario/riassunto

This textbook provides comprehensive coverage of the fundamentals of integrated quantum photonics (IQP) and its key applications. While there are books available in the fields of quantum, integrated, and nonlinear optics, there is no single book which provides extensive coverage of the fundamentals in a unified context for understanding the field of IQP and its applicability in emerging research and industrial areas. Based on the author’s classroom-tested lecture courses and tutorials delivered around the world, the book has a pedagogical approach with concepts derived from basic principles, and enhanced with exercises to hone both the reader’s fundamental understanding and ability to apply the core concepts. As IQP is expected to play a significant role in the future of quantum information science and technology, this book will provide a much needed source of fundamental and practical knowledge for the novice or advanced reader alike. This textbook is ideal for a taught course in integrated quantum photonics at the upper undergraduate or beginning graduate level. It can also be used as a reference for more seasoned researchers and as a self-study resource for industry researchers looking to upgrade their skills and knowledge.