1. Record Nr. UNINA9910863146703321

Autore	Vollmer Frank
Titolo	Optical Whispering Gallery Modes for Biosensing : From Physical Principles to Applications / / by Frank Vollmer, Deshui Yu
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	9783030602352 3030602354
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XIII, 417 p. 142 illus.)
Collana	Biological and Medical Physics, Biomedical Engineering, , 2197-5647
Disciplina	610.28
Soggetti	Biophysics Materials Detectors Biomedical engineering Medicinal chemistry Nanobiotechnology Sensors and biosensors Biomedical Engineering and Bioengineering Medicinal Chemistry
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	From the Contents: Introduction: Need for label-free chip-scale clinical diagnostics and nanoparticle analyzers -- Fundamentals of photonics (light, wave, polarization, interference) -- Fundamental optical properties of biomolecules -- Light matter interaction with biomolecules (Lorentz- model, drude-model, light at a sensor interface, reflection, transmission, evanescent field) -- Physics of optical micro-resonators (fabry perot, microsphere, resonance, photonic atom model, photonic crystals, ring resonator, bottleneck resonator, microtube resonator, capillary resonator).
Sommario/riassunto	This interdisciplinary book covers the fundamentals of optical whispering gallery mode (WGM) microcavities, light–matter interaction, and biomolecular structure with a focus on applications in biosensing.

Novel biosensors based on the hybridization of WGM microcavities and localized surface plasmon resonances (LSPRs) in metal nanoparticles have emerged as the most sensitive microsystem biodetection technology that boasts single molecule detection capability without the need for amplification and labeling of the analyte. The book provides an ample survey of the physical mechanisms of WGMs and LSPRs for detecting affinity, concentration, size, shape and orientation of biomarkers, while informing the reader about different classes of biomolecules, their optical properties and their importance in label-free clinical diagnostics. For the more advanced reader, advanced applications of WGMs and LSPRs in exploring the fundamental nature of quantum physics are discussed. .