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Nota di contenuto	Introduction to Metal-Nanoparticle Plasmonics; Contents; Acknowledgments; Introduction; 1 Modeling: Understanding Metal-Nanoparticle Plasmons; 1.1 CLASSICAL PICTURE: SOLUTIONS OF MAXWELL'S EQUATIONS; 1.1.1 Review of Classical Electrodynamics; 1.1.2 Bulk Plasmons and the Dielectric Function of Metals; 1.1.3 Surface-Plasmon Polaritons at Interfaces; 1.1.4 Guided Plasmon Modes in Wires; 1.2 DISCRETE PLASMON RESONANCES IN PARTICLES; 1.2.1 Metal Spheres in the Quasistatic Approximation; 1.2.2 Spheroids in the Quasistatic Approximation; 1.2.3 Multipolar Response and Mie Theory 1.3 OVERVIEW OF NUMERICAL METHODS 1.3.1 FDTD Methods; 1.3.2 Discrete Dipole Approximation; 1.3.3 Boundary-Element Methods; 1.3.4 Multiple Multipole Methods; 1.4 A MODEL SYSTEM: GOLD NANORODS; 1.4.1 Near-Field Response; 1.4.2 Far-Field Response; 1.4.3 Optical Antennas and Effective Wavelength; 1.4.4 Effect of the Environment; 1.5 SIZE-DEPENDENT EFFECTS IN SMALL PARTICLES; 1.5.1 Surface Scattering and Nonlocal Effects; 1.5.2 From Plasmonic Nanoparticles to Molecular Clusters; REFERENCES; 2 Making: Synthesis and Fabrication of Metal Nanoparticles; 2.1 TOP-DOWN: LITHOGRAPHY 2.1.1 Optical Lithography and Pattern Transfer 2.1.2 Electron Beam

Lithography; 2.1.3 Focused-Ion-Beam Milling; 2.1.4 New Methods; 2.2 BOTTOM-UP: COLLOIDAL SYNTHESIS; 2.2.1 Quasi-Spherical Gold and Silver Colloids; 2.2.2 Anisotropic Nanoparticles; 2.3 SELF-ASSEMBLY AND HYBRID METHODS; 2.3.1 Langmuir-Blogdett Films; 2.3.2 Colloidal Crystals; 2.3.3 Deposition in Self-Organized Templates; 2.3.4 Template-Assisted Self-Assembly; 2.3.5 New Methods; 2.4 CHEMICAL ASSEMBLY; 2.4.1 Functionalization of Metal Nanoparticles; 2.4.2 Assembly Using DNA Molecules; 2.4.3 Anisotropic Assembly of Nanorods
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3.3.4 Photoelectron-Emission Microscopy REFERENCES; 4 Coupled Plasmons in Metal Nanoparticles; 4.1 PAIRS OF METAL NANOPARTICLES; 4.1.1 Pairs of Spherical Nanoparticles: The Plasmon Hybridization Model; 4.1.2 Pairs of Nanorods; 4.1.3 Touching and Nearly Touching Nanoparticles; 4.2 UNDERSTANDING COMPLEX NANOSTRUCTURES USING COUPLED PLASMONS; 4.2.1 Shells, Rings, and Stars; 4.2.2 Fano Resonances; REFERENCES; 5 Nonlinear Optical Response of Metal Nanoparticles; 5.1 REVIEW OF OPTICAL NONLINEARITIES; 5.1.1 Nonlinear Coefficients; 5.1.2 Pump-Probe Spectroscopy; 5.2 TIME-RESOLVED SPECTROSCOPY
5.2.1 Pump-Probe Measurements

Sommario/riassunto

Based on a popular article in Laser and Photonics Reviews, this book provides an explanation and overview of the techniques used to model, make, and measure metal nanoparticles, detailing results obtained and what they mean. It covers the properties of coupled metal nanoparticles, the nonlinear optical response of metal nanoparticles, and the phenomena that arise when light-emitting materials are coupled to metal nanoparticles. It also provides an overview of key potential applications and offers explanations of computational and experimental techniques giving readers a solid grounding

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