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The manipulation of light at the nanometer scale is highly pursued for both fundamental sciences and wide applications. The diffraction limit of light sets the limit for the smallest size of photonic devices to the scale of light wavelength. Fortunately, the peculiar properties of surface plasmons in metal nanostructures make it possible to squeeze light into nanoscale volumes and enable the manipulation of light and light–matter interactions beyond the diffraction limit. Studies on surface plasmons have led to the creation of a booming research field called plasmonics. Because of its various scientific and practical applications, plasmonics attracts researchers from different fields, making it a truly interdisciplinary subject.

Nanophotonics: Manipulating Light with Plasmons starts with the general physics of surface plasmons and a brief introduction to the most prominent research topics, followed by a discussion of computational techniques for light scattering by small particles. Then, a few special topics are highlighted, including surface-enhanced Raman scattering, optical nanoantennas, optical forces, plasmonic waveguides and circuits, and gain-assisted plasmon resonances and propagation.

The book discusses the fundamental and representative properties of both localized surface plasmons and propagating surface plasmons. It explains various phenomena and mechanisms using elegant model systems with well-defined structures, is illustrated throughout with excellent figures, and contains an extensive list of references at the end of each chapter. It will help graduate-level students and researchers in nanophotonics, physics, chemistry, materials science, nanoscience and nanotechnology, and electrical and electronic engineering get a quick introduction to this field.

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