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Two-dimensional (2D) crystalline materials, which consist of a single layer or a few layers of atoms, have attracted tremendous interest since the study of graphene in the early 21st century. With their angstrom-to-nanometer thickness, large surface-to-volume ratio and reduced dielectric screening, 2D materials (including graphene, phosphorene, transition metal dichalcogenides, silicene and other inorganic and organic materials) can be an ideal platform to study fundamental many-body interactions because of reduced screening and can also be further engineered for nanophotonic applications.

This book compiles research outcomes of leading groups in the field of 2D materials for nanophotonic physics and devices. It describes research advances in 2D materials for various nanophotonic applications (e.g., ultrafast lasers, atomically thin optical lenses and gratings to inelastically manipulate light propagation), their integration with photonic nanostructures and light–matter interactions. The book focuses on actual applications, while digging into the physics underneath. It targets advanced undergraduate- and graduate-level students of nanotechnology and researchers in nanotechnology, physics and chemistry, especially those with an interest in 2D materials.

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