Special Issue

Two-Dimensional Materials for Emerging Photonics and Spintronics Applications

Message from the Guest Editors

Two-dimensional (2D) materials have revolutionized the field of materials science and device engineering due to their unique structural, electrical, and optical properties. Their atomically thin geometry, strong light–matter interaction, tunable electronic band structure, and compatibility with heterogeneous integration have made them particularly attractive for advanced photonic, optoelectronic, and spintronics applications. In recent years, significant progress has been made in using 2D materials—including graphene, transition metal dichalcogenides (TMDs), black phosphorus, and natural hyperbolic van der Waals crystals—for devices operating across the visible, infrared, and terahertz regimes. They demonstrated their potential in ultra-compact photonic and optical components, e.g., modulators, photodetectors, THz emitters, waveguides, and many others. This Special Issue aims to bring together recent advancements and insights into the design, fabrication, characterization, and theoretical modeling of novel and existing 2D materials-based optical, photonic, optoelectronic, spintronics, and electro-optic systems.

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