

Control of quantum emitters and excitons in van der Waals materials

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Single photons are crucial components for a broad range of applications, including quantum computing, quantum communications, and precision sensors. Among various physical systems, solid-state materials are promising hosts of single-photon emitters thanks to their scalability and structural durability. Recently, van der Waals layered materials have gained significant interest as a potential platform for quantum emitters integrated with photonic circuits as well as for nanoscale control. For example, hexagonal Boron Nitrides embed atomic defects which operate even at high temperature, while transition metal dichalcogenides host strain-induced quantum-dot-like localized excitons. This seminar provides an overview of the current status, opportunities, and challenges associated with single-photon emitters in two-dimensional materials.