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Semiconductor nanophotonics, single photon devices, quantum optics of plasmonic hybrid systems, 2D semiconducting layered materials

We are “Semiconductor Quantum Optics Lab” of the Electrophysics Department, NCTU. Our primary research interests include: (a) **Quantum dot single photon devices**: We have developed quantum-dot based single photon devices and studied their fundamental light-matter interactions. (Figure 1). (b) **Quantum optics of plasmonic hybrid systems**: We studied the quantum optics of plasmonic hybrid system, such as plasmonic nanolasers, and diamond based single photon emitters (Figure 2). (c) **2D semiconducting layered materials**: Recently, we have been intensively focused on the material growth, spin-valley physics and device applications of 2D transition metal dichalcogenides (TMD, MoS₂, MoSe₂, WS₂, WSe₂). CVD growth of vertical and lateral heterojunctions, and their device applications are particularly focused topics. (Figure 3). **Key Facilities**: Low-temperature optical (3.8 K) spectroscopy/Microscopy in high magnetic field, ultrafast spectroscopy, CVD growth of TMDs, facilities for devices fabrications.

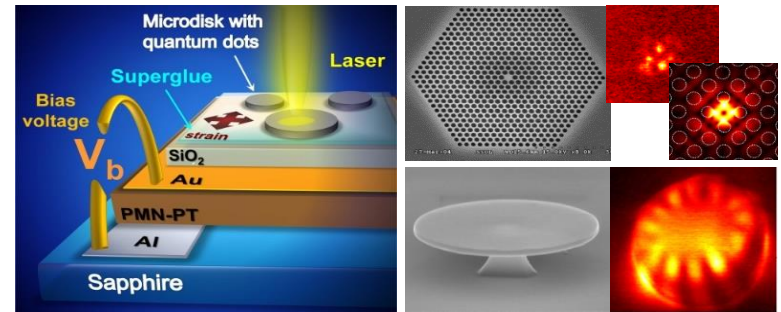


Figure 1

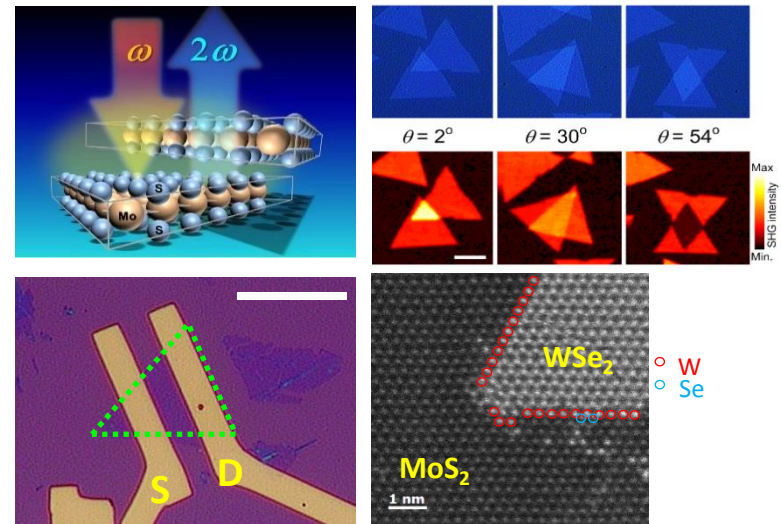


Figure 3

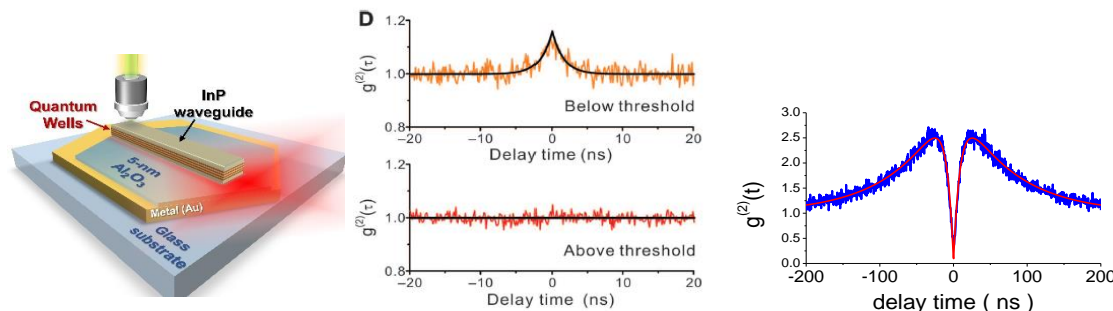


Figure 2