

Tip-induced light-matter interactions in low-dimensional quantum materials**Pohang University of Science and Technology (POSTECH)¹****Kyoung-Duck Park****E-mail: parklab@postech.ac.kr**

Structure, functions, dynamics, and interactions are the basic properties to systematically understand physical systems existing in nature, including low-dimensional quantum materials. There have been many scientific adventures to understand light-matter interactions in low-dimensional quantum materials, yet in the classical regime at the microscale due to the diffraction-limited optical resolution. Recently, tip-enhanced spectroscopy enables to induce light-matter interactions in addition to probe them at the nanoscale. In this talk, I provide a novel concept of tip-induced light-matter interactions, overcoming the limitations of previous nano-spectroscopy and static plasmonic cavity approaches, to induce, probe, and dynamically control ultrastrong light-matter interactions of low-dimensional quantum materials, such as 0D quantum dots and 2D transition metal dichalcogenides (TMDs). Furthermore, I provide several new directions of nano-spectroscopy and -imaging, which have not been thought in the near-field optics community before.