

REINVENTING THE WHEEL: SURFACE ENHANCED RAMAN SCATTERING

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Abstract: Surface-enhanced Raman scattering (SERS) is a near-field optical phenomenon that relies on metal nanostructures to intensify local electric fields and ultimately amplify the Raman scattering cross sections of molecular species in proximity to the metal surface. In recent years, SERS has been demonstrated for single-molecule detection by leveraging on the extraordinarily strong enhancement at sites often referred to as “hot spots”. In this talk, I will introduce our strategy to understand the physical origins of hot spots with an attempt to map the distribution of electric fields on a metal nanostructure or across the gap between two nanostructures; demonstrate the importance to establish scientific basis for rational design and systematic engineering of hot spots; and discuss new possibilities to develop SERS as an enabling technology for an array of new applications in sensing, detection, and energy harvesting.