**Lattice plasmons：generation and applications**

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Abstract：Plasmonic lattices, known for supporting Surface Lattice Resonances (SLRs), are pivotal in the advancement of nanophotonics, enabling intricate exploration and manipulation of light-matter interactions at the nanoscale. In this talk, we present a novel and efficient fabrication methodology that allows for the generation of various plasmonic lattices with distinct symmetries, showcasing the versatility of our approach. This technique paves the way for a comprehensive investigation into the interactions between SLRs and quantum emitters, covering a spectrum that extends from the weak coupling regime, evidenced by room-temperature nanolasing with an exceptionally low threshold, to the strong coupling regime, marked by significant Rabi splitting. The incorporation of k-spacing imaging further refines our study by providing detailed visualization of the lasing modes and enhancing the accuracy of strong coupling measurements. The employment of a wide range of gain mediums, including dye molecules, rare earth elements, and perovskites, enriches the lasing performance. This multifaceted approach not only deepens our understanding of SLRs but also significantly widens the scope of potential applications in cutting-edge nanophotonic devices, marking a milestone in the field.

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