

Nanophotonics and Optical Sensing

Functional photonic, plasmonic, metamaterial and metasurface devices

- Design photonic, plasmonic and metamaterial devices to demonstrate optical functionality such as waveguides, wave plates, cavities, color printing, beam shaping and etc.

Novel optical nano-biosensing with high sensitivity and selectivity

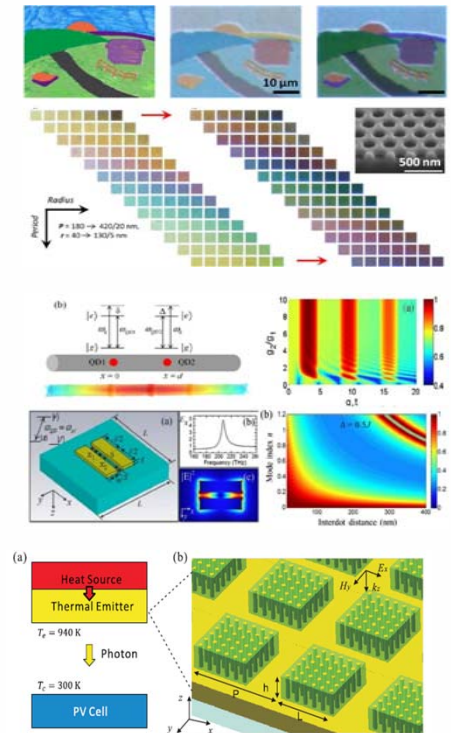
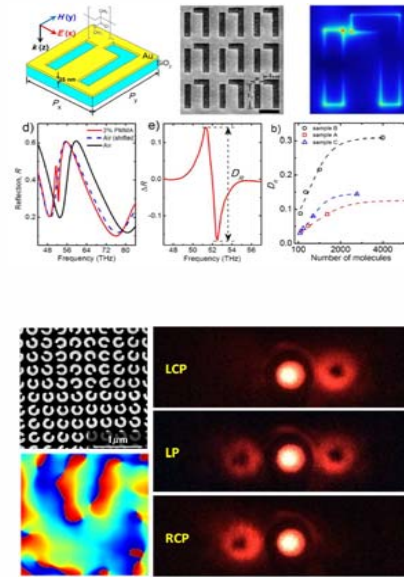
- Develop optical nano-biosensing devices which can detect ultrasmall amount of molecules, and tell them apart from each other through infrared vibrational fingerprints and chirality.

Light-matter interaction between optical nanostructures and quantum emitters

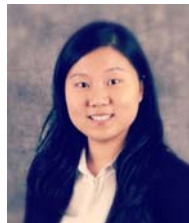
- Study the spontaneous emission rate of quantum dots on engineered optical metamaterials, and explore the light-matter interaction mechanism for information processing.

Thermal energy harvesting and management

- Improve the performance of light absorbers and thermal emitters for thermal photovoltaic applications.



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Recent Funding

National Science Foundation, Oak Ridge Associated Universities, NASA, Argonne & Sandia National Lab.

Keywords

- #Nanophotonics, #Plasmonics, #Metasurfaces, # Optical sensing

Awards

- 2017 NSF CAREER Award
- 2014 Ralph E. Powe Junior Faculty Enhancement Award

Potential Collaboration Fields

- Biosensors, Chemical sensors, Microfluidic devices, Proteins, Spectroscopic study of molecules or biological samples