

Nanophotonics: There's Plenty of Room to “Light up” the Bottom

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Light-matter interaction is one of the fundamental phenomena of the universe that has significantly shaped the evolution of the human society, both biologically and physiologically. In this talk, we present research on light-matter interactions at nanoscale, also known as “nanophotonics”, for applications in data communications, imaging, display and solar energy harvesting. We will discuss the fundamental physics and broad applications of nanophotonics through a few examples, including ultralow power optical modulation for energy-efficient data centers, room-temperature single photon detection enabled by CMOS scaling, photon management in 2D materials towards new flexible display technologies, and harnessing the interaction between sunlight and transition metal oxide nanoparticles towards dispatchable solar electricity. Adapting Feynman’s famous quote envisioning the advent of nanotechnologies, we show that not only is there “plenty of room at the bottom”, but plenty of room to “light up” the bottom as well.