

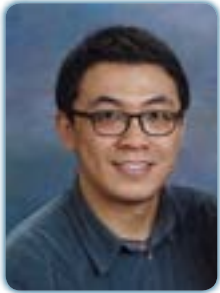
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Extreme Light-matter interaction

The unprecedented ability of nanostructures to concentrate light into extreme dimensions is promising to develop new applications for enhanced light-matter interaction. In general, it is a grand challenge to manipulate light within extreme dimensions along both vertical and lateral dimensions. Along the vertical direction, there is a long-existing trade-off between optical absorption and thickness of active materials in most thin-film energy harvesting/conversion applications. Particularly, research on two-dimensional (2D) atomic crystals and Van der Waals heterostructures receive intense efforts, which is promising for the development of new functional electronic and optoelectronic energy efficient devices with the ultimately thin dimension along the vertical direction. However, due to their atomically thin nature, the optical absorption is inherently weak. On the other hand, along with the lateral direction, it is also a grand challenge to break the classic diffraction limit, which was a long-term target in many important areas including nanoscopic imaging, lithography, etc. In this talk, I will present an overview of several potential strategies to overcome these two grand challenges using new light-matter interaction strategies within extreme dimensions. We will aim to boost the weak light-matter interaction along vertical and lateral dimensions and pave the way towards new applications.

Biography

Qiaoqiang Gan is an Associate Professor in the Department of Electrical Engineering at University at Buffalo, The State University of New York. He received his PhD degree from Lehigh University in 2010. He is the recipient of Exceptional Young Investigator of University at Buffalo (2016) and the Senior Researcher of the Year 2017 of School of Engineering and Applied Science. His research publications include over 90 technical papers and 4 patents. He serves as the associate editor for Scientific Reports (NPG), IEEE Photonics Journal and J. of Photonics for Energy (SPIE).

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