Light Science & Applications

Manipulating Nonclassical Light with Emitter-Coupled Quantum Metasurfaces

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Metasurfaces, i.e., ultrathin arrays of engineered meta-atoms, have attracted increasing attention due to their unprecedented capabilities of molding classical light. As metasurfaces revolutionize optical designs by replacing bulky optical components with ultrathin planar elements, numerous compact devices have been demonstrated. Besides controlling classical light, metasurfaces have the potential to emerge as essential components for nonclassical optical fields even at the single-photon level. In this talk, I will talk about a conceptually new approach of on-chip emitter-coupled quantum metasurfaces to the room-temperature generation of non-classical structured light entailing quantum emitters non-radiative coupling to surface plasmons that are transformed, by interacting with an optical metasurface, into a collimated stream of single-photon sources with the designed spin angular momentum, orbit angular momentum, and polarizations.

Short Bio:

Fei Ding received his PhD degree in Optical Engineering from Zhejiang University, China. He is now a tenured associate professor at the University of Southern Denmark, Denmark. He is an OSA Senior member and a recipient of the Villum Young Investigator and DFF Inge Lehmann grants. His research interests include nanophotonics, metasurfaces, plasmonics, and quantum nanophotonics. He has published over 80 articles in peer-reviewed journals, such as *Nature Communications*, *Science Advances*, *Light: Science & Applications*, etc. Remarkably, his papers have been cited > 5300 times according to Web of Science with an H-index of 34 and his publication list contains 12 ESI Highly Cited Papers. He has received several awards and honors, including Wang Daheng

Optical Prize for Graduate Student (2014), the PIERS Young Scientist Award (2018 and 2019), Villum Young Investigator (2021), DOPS Award (2022), Materials Today Rising Star (2022), and the World's Top 2% Scientists (career-long list in 2023 and singer-year list from 2021 to 2023). He is an active reviewer of more than 20 international journals and received the Publons Peer Review Awards (2018 and 2019). He is now serving as an Associate Editor of *IEEE Photonics Journal*, Topical Editor of *Applied Optics*, and the youth editor of SCIENCE CHINA Physics, Mechanics & Astronomy, and Chinese Optics Letters.