

Planar optics based augmented reality 3D display

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Augmented reality (AR) is an emerging technology that can transform our world by creating immersive experiences for users to interact with the digital world. However, the AR visual experiences can be provide only through a wearable device. On the other hand, glasses free 3D displays provide depth cues without the aid of any wearable devices, but the 3D virtual objects can't be fused with physical world behind the screen. The fast-growing field of flat optics has attracted broad interest for AR development because of their extraordinary control over light propagation. This presentation highlights how planar optical elements ranging from diffractive gratings to metasurfaces provide game-changing solutions for glasses-free AR 3D display technology. Using rationally designed nanostructures that tailor the optical wavefront properties (such as phase and polarization) with subwavelength precision, these ultrathin optics are driving advances in 3D displays in all aspects: significantly enlarged field of view, suppressed crosstalk, and double-sided view. To realize this precise 3D control over light, we established the crucial multiscale fabrication methods that enable scalable production of the AR 3D metasurfaces. We expect that our innovations in glasses-free 3D displays will turn into AR technology that reshapes our everyday life.



Short Bio:

Wen Qiao received Ph.D. in Photonics from University of California, San Diego. She is now a full professor at school of optoelectronic information science and engineering of Soochow University. Professor Qiao's areas of research center on the developments of novel nanostructures for photonic devices in 3D display and augmented reality display. She has published more than 50 journal papers, including in *Advanced Materials*, *Light: Science & Applications*, and *Optica*, and applied for/granted more than 100 patents. She won the annual outstanding display young talent award of the International Society for Information Display (SID) Beijing Chapter, and the first prize of Jiangsu Science and Technology 2022 (Ranked 2). She is the director of the Digital Laser Imaging and Display Engineering Research Center of the Ministry of Education, and the executive director

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