Double-layer disordered metasurfaces for predictable spatial-spectral mixing

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This talk will explore ways to predictably mix and demix optical information in a random fashion. First, I will present a way of using disordered metasurface to unlock a spatial optical space that is inaccessible using conventional optics. In particular, I will explain how wavefront shaping through the engineered complexity enables control over an unprecedentedly large number of input-output channels ($>10^{13}$; 5 orders of magnitude larger than the previous record) and offers optical focusing and imaging capabilities beyond those of conventional optics. Next, I will introduce a random dispersive element—double-layer disordered metasurfaces—that predictably mixes optical information in the spatial-spectral domain. As an application example, I will present a proof-of-concept of on-sensor spectrometer based on a demixing process using computer-generated speckle libraries.

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References
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