**Metasurfaces for Extreme Ultraviolet Light Pulses**  
**(Session 4, Oral)**

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Extreme ultraviolet (EUV) light enables attosecond physics and nanoscale semiconductor lithography. Unfortunately, all materials absorb it due to its large photon energy, and no transmissive optics exist. In my talk, I will introduce how we overcome this lack of optical elements using ultrathin metasurfaces [1]. These novel optics comprise millions of high-refractive-index nanopillars on flat substrates. The small extent of these building blocks allows researchers to mold the spatial phase of light on the sub-wavelength scale, an ability that currently revolutionizes the handling of visible light. However, for the EUV spectrum, no high-refractive-index materials exist. I will introduce how holes in silicon can act as guiding structures for EUV light, how we can exploit this fact to create metaoptics for 50-nm radiation, how we manufacture and characterize such elements, and the possible applications enabled by this first universal transmissive optics technology for the EUV.

[1] M. Ossiander et al., Extreme ultraviolet metalens by vacuum guiding. Science 380, 59-63(2023).