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HPERO WEBINAR "NANOPHOTONIC ENGINEERING OF PEROVSKITE METASURFACE FOR LIGHT-EMITTING DEVICES"

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En ligne sur zoom
https://ens-paris-saclay-fr.zoom.us/j/92579035578?pwd=pqoJ6i7baw4tmRZ5DAc2UjzRavzslT.1

Halide perovskites have become highly promising materials for light-emitting devices, including color-conversion layers, perovskite light-emitting diodes, and lasers. Yet, in conventional planar architectures, a large portion of the emitted light is lost to waveguided modes through total internal reflection, limiting device performance. To overcome this limitation, we apply nanophotonic engineering to hybrid and all-inorganic perovskite thin films using direct thermal nanoimprint lithography. A nanopatterned silicon mold is pressed onto the crystallized perovskite layer under 300–400 bar during annealing, forming perovskite metasurfaces with nanometric periods. These act as both active media and diffractive elements that tailor the optical response (e.g., emission pattern and absorption). This approach enables control over photonic resonances at targeted wavelengths to enhance emission, linear and nonlinear absorption, or both. In this talk, I will highlight our work on simultaneous enhancement of emission and two-photon absorption in a hybrid perovskite thin film, then present a prototype metasurface LED and our progress toward all-inorganic perovskite light-emitting devices.