Colloquium

Halide Perovskite Semiconductors: From the Nanoscale to the Global Scale

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Halide perovskites are generating enormous excitement owing to their use in high-performance device platforms including solar cells, LEDs, X-ray detectors and quantum emitters. However, there remains performance losses and operational instability pathways in devices that limit their true potential. This talk will outline a series of multimodal microscopy approaches to unveil nanoscale insights into perovskite devices, providing detailed information about the impact of defects on both performance and stability. Correlations between local structural and carrier trapping measurements reveal nanoscale sites that act as carrier traps and sites that seed degradation. At low temperature, these same defects also show fascinating quantum emission behaviour. I will also show our latest understanding on local octahedral correlations that impact optoelectronic properties. Finally, I will demonstrate how controlled layer-by-layer epitaxial vapour growth leads to high-quality 2D/3D heterojunctions, making the building blocks for tuneable multi-quantum well structures.

Tuesday, September 16, 2025 11:00am - 12:00pm
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)

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