Spatially resolved electroluminescence imaging of OLED inhomogeneity

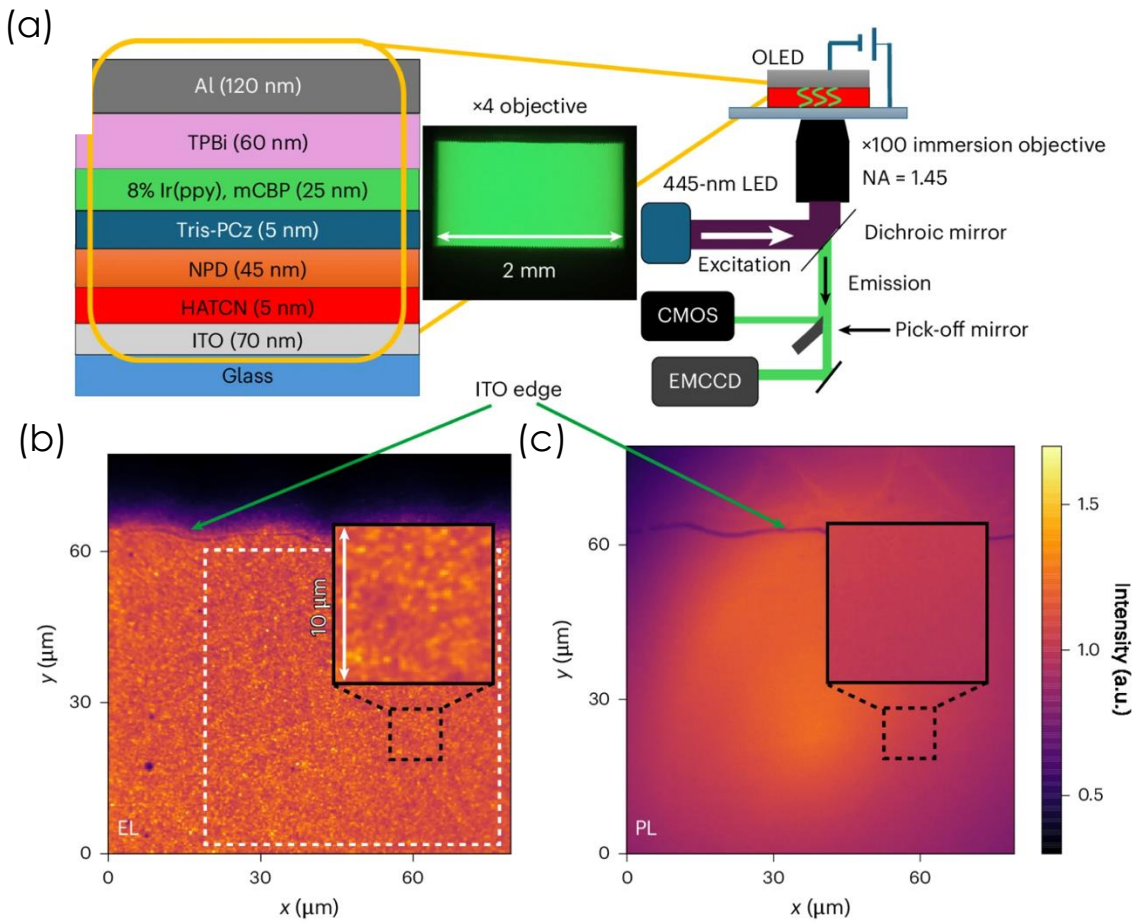

Figure: (a) OLED device structure and wide-field microscopy setup used for spatially resolved electroluminescence and photoluminescence imaging. (b) Representative EL and (c) PL emission maps of the OLED device. EL exhibits strong spatial inhomogeneity while the PL does not, suggesting that electrical transport dominates the observed emission nonuniformity.

Objective

➢ To understand how charge transport in amorphous organic semiconductors influences light emission patterns

Impact

Charge transport in amorphous organic semiconductors is predicted to be spatially nonuniform due to energetic disorder and filamentary conduction pathways. We use spatially resolved electroluminescence imaging to probe these inhomogeneities. Understanding these fluctuations is important for improving OLED efficiency, uniformity, and long-term device reliability.

Facilities and Methods Used

- Vacuum Thermal Evaporation
- Great Lake high-performance computing cluster
- Lurie Nanofabrication Facility (LNF)
- Atomic Force Microscopy (AFM)

Relevant Papers

- J. D. Springsteen, et al., Nature Photonics, DOI: 10.1038/s41566-026-01867-6

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Contact

- Joshua Springsteen (jsprings@umich.edu)