ECE ELECTRICAL & COMPUTER ENGINEERING UNIVERSITY OF MICHIGAN

Electrical and Computer Engineering

ECE Final PhD Defense

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Understanding and Controlling the Morphology of Organic Thin Films

Wednesday, May 26th, 2021 9:00 – 11:00 am • Remote/Virtual https://umich.zoom.us/j/98852923539?pwd=VUYxTkVId0t5MIgwdEtPMkJ QeEJjUT09 Meeting ID: 988 5292 3539 Passcode: 048625

Chair: Professor Stephen Forrest



Abstract: Morphology of thin films is one of the key factors governing the properties of a solid. Morphology usually refers to film structures shown by crystallinity, orientation, thermal stability and homogeneity of a film, which determines its optical and electrical character. Precise control of the morphology is, therefore, crucial for developing high performance devices. In this talk, we will discuss desirable film morphologies required in high performance OLEDs, and provide solutions to achieve the desired film structures. In particular, a film morphology to improve the light extraction of an emissive layer will be shown, by utilizing anisotropic molecular structures, structural template layers, or limited dimensional systems to orient the transition dipole moment vector in a desired way (i.e., parallel to the substrate plane). In addition, a measurement technology will be demonstrated which provides precise nanoscale information about the morphologies of different organic thin film structures using Fourier plane imaging microscopy. The methods to understand and control the film morphology in this talk will provide insights to improve the OLED performance, paving the way to a ubiquitous use of organic devices in the near future.