Nanoscale mapping of morphology of organic thin films

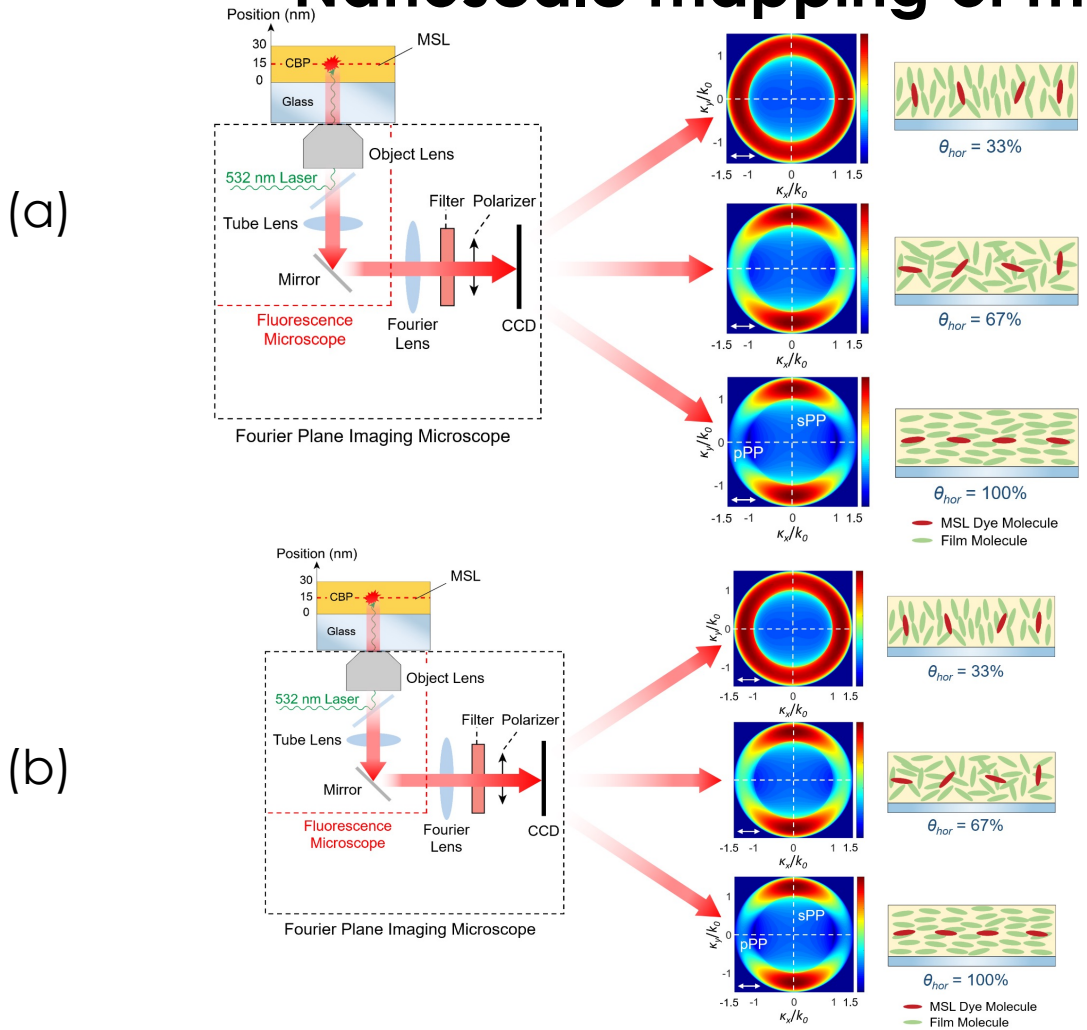

Figure: (a) The red dashed line box shows a schematic of the fluorescence microscope, and the black box shows the imaging system. Polar images (center) at different polarizations (shown by arrows) corresponding to the emission due to orientation of the dye molecules in the MSL (red ovals, illustration to right) in the morphology of the host matrix (green ovals). (b) Illustration showing the placement of the PtOEP MSLs within a CBP/TPBi bilayer, with the measured polar plots before and after annealing at the right.

Objective

➢ To reveal the detailed nanoscale morphology within organic electronic thin films using Fourier plane imaging microscopy (FIM)

Impact

Simple, precise and sensitive morphological investigation is achieved with full 3D investigation. Lateral resolution is defined by half the visible wavelength (~200nm) and vertical resolution is defined by QCM thickness control and flatness of the film (Å scale). This technology can be used with all van der Waals solid films, regardless of the fabrication process.

Facilities and Methods Used

- Fourier plane Imaging Microscopy
- Vacuum Thermal Evaporator (VTE)
- VASE
- XRD

Relevant Papers

- J. Kim et al., *Phys. Rev. Applied*, DOI: 10.1103/PhysRevApplied.14.034048 (2020)

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Collaborators

- Prof. Vinod Menon, City University of New York