

The 818<sup>th</sup>

# MANA Seminar



## Imaging operating p-n junctions using femtosecond photoemission electron microscopy

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**Friday, January 23<sup>rd</sup> 14:45 – 15:30**

The p-n junction interface forms a depletion layer due to differences in electron affinity and bandgap. This structure acts as a rectifier to control current flow, separates photogenerated electrons and holes in solar cells, and serves as the light-emitting site in LEDs. However, techniques for observing mobile charges, such as electrons and holes, are limited. There have been no studies of the real-space and energy-space structures of the depletion layer. Therefore, we have developed a photoemission electron microscopy using a femtosecond laser as a light source to clarify the role of the interface from the charge carrier dynamics and the structural evolution of the depletion layer. Furthermore, by constructing a system that enables continuous variation of the photon energy of femtosecond pulses across the near-infrared to ultraviolet region, charge dynamics can be observed with time, space, and energy resolutions. This presentation will introduce results on the dynamics of electrons crossing the p-n junction in model organic solar cells, operando observation of electrons in organic transistors, and imaging of the depletion layer in GaAs-based tunnel diodes.

**Venue:** Auditorium, 1F, WPI-MANA Bldg., Namiki

**Chair:** Dr. Takashi Nakanishi (MANA Group Leader)

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