

Seminar

Electronic Doping of Organic Semiconductors: Fundamental Understanding and Applications in Optoelectronic Devices

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Optoelectronic devices such as photovoltaics, light-emitting diodes, photodetectors, and displays are central to renewable energy generation, lighting, and advanced communication and sensing systems, and their role is set to grow with the rise of flexible, neuromorphic, and bio-integrated electronics. A key way to improve these devices is by controlling the electronic and optical properties of the organic semiconductors (OSCs) they are built from, which can be achieved through electronic doping. In this talk, I will present doping strategies aimed at optimising charge transport, minimising energy losses, and improving the long-term operational stability of OSC-based devices, while addressing conventional limitations such as metal-ion migration, poor doping efficiency, and inadequate ambient stability. I will discuss how dopant counter-ions govern the electronic and optical properties of the host material, and present new methods for electronic trap passivation and ambient-processable OSC materials. Together, these studies build a detailed picture of how doping and counter-ion shape charge transport, trap densities, polaron formation, and device performance in organic semiconductors.

Thursday, Oct 1st 2026

10:30 Hrs (Tea / Coffee 10:15 Hrs)

Auditorium, TIFRH