National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Molecular Design, Synthesis and Photophysical Investigations of Imidazole based D-π-A Fluorophores for Light Emitting Diodes, Sensing and Latent Fingerprint Detection
Speaker	: Bhabana Priyadarshini Debata (Rollno : 520cy3017)
Supervisor	: Sabita Patel
Venue	: Chemistry Seminar Room
Date and Time	: 11 Jul 2025 (11.00AM)
Abstract	: The development of efficient organic fluorophores with tunable photophysical properties is crucial for advancing next-generation optoelectronic and sensing technologies. In this work, a series of novel imidazole-based donor-&pi-acceptor (D-&pi-A) fluorophores have been designed and synthesized through rational molecular engineering and functionalized with various &pi-bridges to achieve desirable electronic and emission behavior. The structure properties relationship was studied through both theoretical and experimental methods. By tuning the electronic structure through donor and acceptor substitution, with different &pi-bridges, the compounds exhibit strong intramolecular charge transfer (ICT), hybridized local and charge transfer (HLCT) excited states, and aggregation-induced emission (AIE) behavior. These fluorophores demonstrate excellent performance in OLED applications, with high emission efficiency, color purity, and external quantum efficiency (EQE). These synthesized fluorophores are also used in the fabrication of hybrid white LEDs, chemosensing, and latent fingerprint applications.