**Tata Institute of Fundamental Research**
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

# Internal Webinar

## Development of Sustainable Luminescent Materials Based on Earth-Abundant Copper(I) Iodide Clusters and Zn(II) & Al(III) Emitters

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The field of luminescent copper(I) clusters has gained significant attention owing to their structural versatility, excellent photoluminescence, and environmentally benign nature, making them promising candidates for next-generation optoelectronic applications such as LEDs, luminescent solar concentrators, and X-ray scintillators. Molecular complexes, particularly all-in-one (AIO) copper(I) iodide clusters and donor-acceptor-based Cu(I) systems, have gained attention due to their tunable emission properties and high quantum yields. In this talk, I will present our recent work on the synthesis and structural characterisation of luminescent copper(I) iodide clusters and carbazole-based Cu(I) and Zn(II) complexes using rationally designed donor-acceptor ligands. Detailed photophysical studies and DFT/TD-DFT calculations have enabled us to establish their structure–property relationships that govern emission behaviour. I will also highlight our efforts toward the development of sustainable Al(III) and Mg(II) based TADF emitters through judicious molecular design. The design of heavy-metal-free, solution-processable emitters not only has importance for fundamental studies but also has potential technological applications in OLEDs and lighting devices. These aspects will be presented in this talk.

***Monday, Sep 7th 2026***

***14:30 Hrs***