

17TH NOVEMBER 2025, 16:00
SEMINAR ROOM

Since first reported, luminescent rare earth doped nanoparticles have attracted a great deal of interest. In the last decade, the interest stems primarily from the ability to stimulate luminescent nanoparticles with near-infrared (NIR) light as well as their diverse emission wavelengths spanning the UV to the NIR. With a single NIR excitation wavelength, it is possible to observe higher energy luminescence or single photon NIR emission. The former, named upconversion, proceeds through the sequential absorption of multiple NIR photons through the long-lived 4f electronic energy states of the tri-positive rare earth ions. As a result, it is several of orders more efficient than conventional multiphoton absorption processes. This is especially interesting for applications in theranostics (therapy + diagnostics on the same platform) where the upconverted light can be used to trigger another light activated modality (therapy) while the NIR luminescence can be used for bioimaging and nanothermometry (diagnostics). Here, we present our work on the synthesis and development of various NIR excited (and emitting) core/shell rare earth doped nanostructures/nanoplatfroms and demonstrate how their various emissions could be harnessed for applications in theranostics and nanomedicine. In collaboration with CNR/Istituto di Fotonica e Nanotecnologie.

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Illuminating the Path to Theranostics with Rare Earth Nanoparticles

DII SEMINAR

