Optical study of colloidal quantum dots: toward efficient emission and lasing upon single- and multi-photon excitation

Colloidal quantum dots (CQDs) have become the research hotspot due to their exceptional merits including the facile emission spectral tunability by size and composition tailoring, the solution processibility, the broad absorption and the narrow emission spectra and so on. My main efforts are devoted to explore the fundamental linear and nonlinear optical properties of CQDs in order to optimize the optoelectronic properties and to develop applications of CQD-based micro-lasers. In particular, by rationally designing and employing core-multi-shell CQDs, composition-controllable ternary and quaternary CQDs as the optical gain materials, we have achieved efficient stimulated emission and lasing with wavelength tunable across the whole visible spectral range. Our results represent a great progress in the development of CQD-based lasers and hold strong potential in wide range of field in biology and photonics and their interaction of biophotonics.

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Time: 2.00pm
Venue: NTU SPMS CBC Conference Room CBC-02-01
Supervisor: Assoc Prof Sun Handong