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

Seminar

Rashba and Excitonic Physics in Emerging Materials and Correlations with Light-Matter Interaction: A Computational Insight

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We have successfully correlated the Rashba splitting with Excitonic Radiative lifetime in lower dimensional condensed matter systems with different periodic confinements and interfacial configurations, which would certainly have tremendous impact in discovering the emerging optoelectronic materials based on the fundamental charge carrier recombination in the light matter interactions. We have also envisaged the transition between Rashba, Rashba-Dresselhaus and Persistent Spin Textures in novel perovskite systems in the form of a quasi-2D confinement. We continued our quest of Rashba splitting driven water splitting mechanism in inorganic perovskite materials. The next part will be devoted to theoretical understanding of piezochromism, where hydrostatic pressure could be employed as an effective tool, giving rise to novel crystal structures and optical properties, while it has proven to be an alternative to chemical pressure. Therefore, new functional materials with intriguing properties can be designed by exerting external pressure and strain. In this connection, the composition dependent transition between Frenkel Exciton to Wannier-Mott Exciton in inorganic perovskites will be discussed. I will end my talk touching upon our recent successful endeavour of pre-intercalation mechanism in energy storage materials, as recently appeared in Nature Materials.

Tuesday, Feb 17th 2026

14:30 Hrs (Tea / Coffee 14:15 Hrs)

Auditorium, TIFRH