

## **Seminar**

### **Exploring Photonic Spin Hall Effect for Materials' Studies**

**Janmey Jay Panda**

**TIFR, Hyderabad**

Light-assisted, non-invasive characterisation tools offer the possibility of analysing/diagnosing materials at the device level. Among these, the Photonic Spin Hall Effect (PSHE) has emerged as a promising technique for the sensitive probing of materials by analysing the spin separations created in light beams while interacting with a dielectric medium. Our research explores the applications of PSHE for material characterisation, focusing on ultra-thin film and 2D material characterisation in reflection geometry. A retro-reflected PSHE technique has also been developed offering a high degree of spatial resolution and easy integration of the technique with an optical cryostat. Theoretical frameworks are established to interpret PSHE data accurately, exploring the detection of magnetic and optical properties in various materials, including thin films and 2D atomic layers. Moreover, the study lays the groundwork for utilising PSHE to investigate valley-engineered materials, providing insights into their unique properties.

***Monday, Jan 27<sup>th</sup> 2025***

***10:30 Hrs (Tea / Coffee 10:15 Hrs)***

***Auditorium, TIFR-H***