

# Arkajit Mandal

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**Title:** Extraordinary transport properties of light-matter hybrid systems

**Abstract:** In this talk, we will discuss how quantum light-matter interactions can lead to enhanced transport of exciton or charge carriers. We will examine how phonon-induced decoherence can be significantly suppressed when a material is strongly coupled to confined radiation modes in optical cavities. This suppression of decoherence results in the coherent ballistic propagation of exciton-polaritons, in contrast to the slow diffusive transport of excitons in materials outside optical cavities. Finally, we will explore how light-matter interactions can contribute to defect tolerance in materials, enhancing the transport properties of defective materials. This enhanced defect tolerance can improve both exciton and electron transport, even in extremely lossy cavities.