



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

*Block JD, Sector III, Salt Lake, Kolkata 700 106*

## **DEPARTMENTAL SEMINAR**

# **Department of Astrophysics and High Energy Physics**

**01<sup>st</sup> February, 2023**

**4.00 PM**

**ONLINE/ FERMION**

### **SPEAKER**

**Dr. SOUMYAKANTI BOSE,  
Postdoctoral Research Fellow,  
Seoul National University**

### **TITLE OF THE TALK**

Quantum teleportation of optical qubits using Gaussian resources

### **ABSTRACT**

We compare single-photon qubits and hybrid qubits as information carriers through quantum teleportation using a Gaussian continuous-variable channel. A hybrid qubit in our study is in the form of entanglement between a coherent state and a single photon. We find that hybrid qubits outperform photonic qubits when coherent amplitudes of the hybrid qubits are as low as  $\alpha \ll 1$ , while single-photon qubits yield better results for larger amplitudes. We analyze further the effect of photon losses and observe that the overall character of teleportation for different qubits remains the same although the teleportation fidelities are degraded by photon losses. Our work provides a comparative look at practical quantum information processing with different types of qubits.

### **HOST FACULTY**

**Prof. Archan S Majumdar**

**Dept. of ASTROPHYSICS AND HIGH ENERGY PHYSICS**

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