

PHYSICS OF COMMUNICATION THEORY

SEMINAR

DR. MANIK BANIK

S. N. Bose National Centre for Basic Sciences, Kolkata

 **Room No. 401, 4th Floor, S. N. Bose Bhaban, ISI, Kolkata**

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Abstract

The seminal 1948 work of Claude E. Shannon laid the foundation of the modern Information Age. His source coding theorem establishes the ultimate limits of data compression, while his channel coding theorem determines the maximum rate at which information can be transmitted reliably through a noisy communication channel. In formulating this theory, Shannon modeled information storage and communication devices as classical systems and abstracted away their underlying physical realization, developing a remarkably general mathematical framework. The advent of quantum information theory has revealed that the physical nature of information-processing devices—whether classical or quantum—can play a fundamentally non-trivial role in information storage, transmission, and computation. This raises a profound question: to what extent do the laws of physics determine the ultimate capabilities of communication and information processing? In this talk, I will discuss how bringing physics back into communication theory not only enables tasks that are impossible in a purely classical world, but also offers a new perspective on some of the deepest questions about the nature of information and reality.

Everyone is invited to attend