# QuanTalks

*IISc Quantum Technologies Initiative (IQTI) Seminar Series*

**Abstract:** The quantum processors of today are highly susceptible to noise due to unwanted interactions with their environment. Mitigating the effects of such noise poses a significant challenge in our quest for robust and scalable quantum computing devices. Quantum error correction (QEC) provides a framework by which errors affecting quantum states can be systematically addressed and the theory of quantum fault tolerance gives a prescription for constructing noise-resilient quantum circuits with faulty quantum gates. In this talk, we will first give a brief introduction to the theory of quantum error correction and quantum fault tolerance. In the second half, we will discuss our recent works on noise-adapted quantum error correcting codes and their potential role in enabling fault-tolerant quantum computation in today's era of noisy intermediate-scale quantum (NISQ) devices.

**Reference**: Achieving fault tolerance against amplitude-damping noise, A. Jayasankar et al, Phys Rev Research, 4, 023034 (2022

## Title

Noise-adapted Quantum Error Correction and Fault Tolerance

## Speaker

Dr. Prabha Mandayam,
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## Date & Time

Wednesday,
14th September 2022,
5 PM (IST)

## Meeting Link

Click here to join the Webinar

**Biography:** Prabha Mandayam is an Associate Professor in the Department of Physics at IIT Madras. She obtained her PhD in Physics from the Institute for Quantum Information and Matter at Caltech. After a Post-doctoral Fellowship with the Optics and Quantum Information Group at the Institute of Mathematical Sciences and a brief stint as Inspire faculty fellow at the Chennai Mathematical Institute, she joined her alma mater in 2014. Her research interests are in the area of quantum computing and quantum information theory. In particular, she is interested in quantum error correction, understanding the interplay between quantum foundations and quantum cryptography, and, using quantum information as a tool to explore fundamental questions in theoretical physics.