National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Quantum computing by fractional quantum mechanics
Speaker	: Abinash Pradhan
Supervisor	: Abinash Pradhan
Venue	: Seminar Room (Dept. of Mathematics)
Date and Time	: 13 Mar 2025 (04.00 PM)
Abstract	: Fractional quantum mechanics extends conventional quantum theory by introducing fractional calculus, offering a powerful framework to explore nonlocal and anomalous diffusion effects in quantum systems. In this work, we propose the development of fractional quantum gates by applying the principles of fractional quantum mechanics. Fractional quantum gates are very useful for faster computation as fractional gates reduce the circuit depth of quantum workload. We develop the mathematical formulation, potential advantages, and feasibility of implementing fractional quantum gates in quantum computation. Our findings suggest that fractional quantum gates could offer new pathways for enhancing quantum information processing, optimizing quantum algorithms, and expanding the landscape of quantum computing beyond integer-order dynamics.