



Quantum Technology: IQTI-Industry Conclave

8 July 2022
CeNSE Auditorium, IISc



✉ office.iqti@iisc.ac.in



<http://iqti.iisc.ac.in>

@IIScQuanTech

Program

- 1:30-2:00pm** Greeting & Networking
- 2:00-2:35pm** Introduction to IQTI
- 2:35-2:45pm** M Tech in QT
- 2:45-3:45pm** QT Research @ IISc
- 3:45-4:00pm** Break
- 4:00-6:00pm** The way forward:
A Brainstorming Session
- 6:00-6:30pm** High Tea



About IQTI

The IISc Quantum Technology Initiative (IQTI) was established in September 2020, with a vision to leverage the diverse and interdisciplinary technical expertise and infrastructure at the Indian Institute of Science in the domain of quantum technology (QT).

The initiative involves about 40 faculty members spread over 11 departments, ranging from physics to computer science and engineering.

By bringing together stakeholders from government agencies, strategic sectors, industry as well as start-ups, IQTI aims to promote the 'Make in India' mission.

Effort is on to build indigenous quantum processors, sensors, simulators etc., together with required skill development and education, in order to keep abreast of global advances in the field.

As part of the vision to lay a solid foundation for QT in India, an M. Tech. in QT program has been started from August 2021.

MTech in Quantum Technology

(First of its kind in India)

This is a 2-year course-based multi-disciplinary program, including an internship in the summer break and a project in the second year.

The program offers the following four thrust areas for specialization:

- Quantum Computation and Simulation
- Quantum Communications
- Quantum Measurement and Sensing
- Materials for Quantum Technologies

Present financial support

- Institute of Eminence funds of IISc
- Centre for Excellence in Quantum Technology project from MeitY
- QuEST projects from DST
- Quantum Research Park supported by the Government of Karnataka
- CSR support and donations



Tie-up of IQTI with SEMI towards common goals in developing Quantum Technology.

Achievements

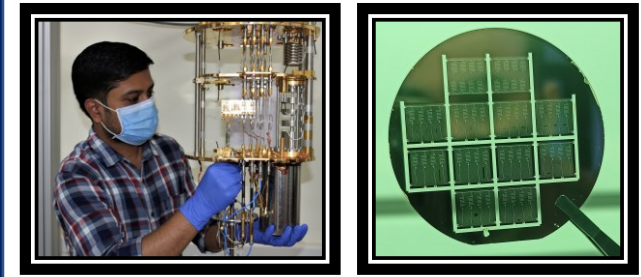
- Four-qubit superconducting transmon processor
- True Random Number Generator using van der Waals heterojunction
- Thermal and magnetic field sensors based on Nitrogen Vacancy centers
- Software simulator for noisy quantum logic circuits



QSim, developed by Prof. Apoorva Patel's lab, has been launched by MeitY as a national educational platform.

Targets for next 3 years

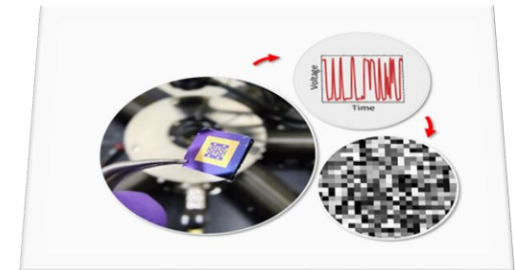
- 20 qubit superconducting as well as photonic quantum processors
- Fibre-based campus-wide QKD network with chip-level device integration
- Atomic clocks and magnetometers
- Hybrid quantum-classical algorithms for simulations, optimisation problems and machine learning
- Quantum-safe cryptography



Superconducting transmon quantum processor developed by Prof. Vibhor Singh's lab: A ready-to-explore platform.

Ways to engage with IQTI

- Establishment of an IQTI-Industry consortium with access to IISc facilities
- Establishment of focused labs
- Industry sponsored research projects
- Visiting and Chair professorships
- Fellowships for MTech & PhD students and Postdocs
- Research and education support through CSR funds



True Random Number Generator developed by Prof. Kausik Majumdar's lab: A breakthrough application of QT.