

**GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
LOK SABHA
STARRED QUESTION No. *258
ANSWERED ON 17/12/2025**

DEVELOPMENT OF SUPERCONDUCTING QUBIT CHIPS

***258. SMT. LOVELY ANAND:**

Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

- (a) whether the Government has initiated collaborative programmes with semiconductor R&D labs and quantum startups to develop superconducting qubit chips, silicon spin qubits and photonic quantum circuits in the country and if so, the details thereof;**
- (b) whether any projects or outreach have been extended to institutions in Bihar and if so, the details thereof;**
- (c) whether semi-cryogenic or dilution refrigeration labs have been commissioned with Indian Institute of Science (IISc), Tata Institute of Fundamental Research (TIFR) or Indian Institute of Technology (IITs) to test sub-50 mK operational environments and if so, the details thereof;**
- (d) the number of Indian patents or preprints filed in quantum error correction, Quantum Key Distribution (QKD) and post-quantum cryptography; and**
- (e) whether a national quantum cloud infrastructure is being built and if any access is being provided to startups and MSMEs including those in Bihar for algorithm prototyping and if so, the details thereof?**

ANSWER

**MINISTER OF STATE (INDEPENDENT CHARGE) OF THE
MINISTRY OF SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)**

(a) to (e): A statement is laid on the Table of the House.

STATEMENT AS REFERRED IN REPLY TO PARTS (a) TO (e) OF LOK SABHA STARRED QUESTION NO. 258 FOR 17.12.2025 REGARDING DEVELOPMENT OF SUPERCONDUCTING QUBIT CHIPS

(a) to (e): Department of Science and Technology is implementing the National Quantum Mission (NQM) with an outlay of ₹6003.65 crore over a period of eight years. Under the Mission, four Thematic Hubs (T-Hubs) were established engaged in Technology Development, Human Resource Development, Entrepreneurship Development & Industry Collaboration, and International Collaborations. One of these T-Hubs is established in Quantum Computing at the Indian Institute of Science (IISc), Bengaluru. Under this Hub, the following six Technical Groups are pursuing collaborative research programmes with semiconductor R&D laboratories, academic institutions, and quantum start-ups to advance superconducting qubit chips, silicon spin qubits, and photonic quantum circuits:

S. No.	Technical Group/Lead Institution	Lead Institution	Technology Domain
1.	Design and Demonstration of a Highly Scalable Quantum Computer using Semiconducting Qubits	IIT Delhi	Semiconducting Qubits
2.	Programmable photonic quantum computing using qubits encoded in different degrees of freedom of a photon	IISc. Bengaluru	Photonic Qubits
3.	Photonics quantum processor development	IISc. Bengaluru	Integrated Photonic Quantum Processor
4.	Quantum Computing with Neutral Atoms, Trapped Ions and Related Hybrid Systems	Raman Research Institute, Bengaluru	Neutral Atom Qubits

S. No.	Technical Group/Lead Institution	Lead Institution	Technology Domain
5.	Development of a 50-qubit quantum information processor with electron spins in silicon	IIT Bombay	Spin Qubits
6.	Quantum computers with super-conducting qubits	Tata Institute of Fundamental Research (TIFR), Mumbai	Superconducting Qubits

In addition, three quantum start-ups are also being supported under the Mission in the area of Quantum Computing, including:

- i. QpiAI India Pvt. Ltd. – Development of a 64-qubit full-stack quantum computer using superconducting qubits.**
- ii. Dimira Technologies Pvt. Ltd. – Indigenous development of cryogenic flexible high-density I/O cables for quantum computers.**
- iii. Prenishq Pvt. Ltd. – High-precision diode laser systems for photonics-intensive quantum technologies.**

Four T-Hubs comprise of 14 Technical Groups and 17 Project Teams, bringing together 152 researchers from 43 institutions across 17 States and 2 Union Territories, including Bihar. Indian Institute of Technology Patna is a Member Institute in the Technical Group on-Quantum Computing with Neutral Atoms, Trapped Ions and Related Hybrid Systems- under the Quantum Computing T- Hub at IISc Bengaluru.

One of the Technical Groups established in the area of superconducting qubits under the National Quantum Mission has initiated the establishment of dilution-refrigeration laboratories at TIFR Mumbai, IISc Bengaluru and TIFR Hyderabad. Procurement and installation activities are in progress, and these facilities are designed to support quantum-hardware testing in the 10–50 mK regime required for superconducting-qubit research. These efforts form an integral part of the Mission’s strategy to strengthen national capabilities in quantum-device prototyping, validation and pilot-scale experimentation.

The Government, through the NQM, is actively supporting research and innovation in quantum error correction, quantum key distribution (QKD), and post-quantum cryptography (PQC). Two startups supported by DST—QuNu Labs and QpiAI—have made significant advancements in quantum technologies. QuNu Labs has developed a distinctive quantum security platform named Qshield. QpiAI has developed a 25-qubit superconducting quantum computer called QpiAI Indus, which integrates advanced quantum processors and next-generation quantum–High Performance Computing (HPC) software platforms.

Patents and preprints arising from these efforts are reflected within the broader national portfolio of quantum technologies. The Mission strengthens mechanisms for documenting and showcasing such outcomes as part of India’s growing quantum ecosystem.

Under NQM, a national quantum-computing ecosystem is supported through the establishment of a Quantum Computing Fabrication Facility at IISc Bengaluru to support indigenous development of quantum-computing chips. The Ministry of Electronics and Information Technology has developed an indigenous quantum simulator (QSim) and a unified quantum-computing platform (Qniverse), integrated with high-performance computing systems, which provide researchers, students, start-ups and MSMEs with access to quantum-algorithm prototyping across multiple hardware backends. These facilities are accessible nationwide, including to start-ups and MSMEs based in Bihar.
