GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
RAJYA SABHA
UNSTARRED QUESTION No. 1408
ANSWERED ON 31/07/2025

QUANTUM TECHNOLOGY

1408 SMT. PRIYANKA CHATURVEDI:

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

(a) the steps taken by the Government to improve Quantum Technology in India;

(b) the progress of the Development of Quantum Technology in India;

(c) whether Government has been taking any steps to develop indigenous Quantum Algorithms, if so, the details thereof; and

(d) whether Government has any vision/mission/target(s) for development of Quantum Technology in India, if so, the details thereof?

ANSWER

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

(a) to (b): The Government is actively advancing Quantum Technology in India:

i. The Department of Science and Technology (DST) is implementing the National Quantum Mission (NQM), approved by the Union Cabinet with a total outlay of ₹6003.65 crore for a period of eight years. Under the Mission, four Thematic Hubs (T-Hubs) have been established in key technology verticals: Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices. These T-Hubs comprise 14 Technical Groups, spanning 17 States and 2 Union Territories. The core activities undertaken by these hubs include technology development, human resource development, entrepreneurship development, industry engagement, and international collaborations. Guidelines to support startups in the area of quantum technologies have also been formulated under NQM. These guidelines were adopted by the Technology Innovation Hub (TIH) – I-HUB Quantum Technology Foundation at Indian Institute of Science Education and Research (IISER), Pune; established under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS). In alignment with these guidelines, the TIH at IISER Pune has supported eight startups in the field of quantum technologies.
ii. Ministry of Electronics and Information Technology (MeitY) has established a Centre of Excellence (CoE) in Quantum Technology and has also deployed the Metro Area Quantum Access Network (MAQAN) in Chennai, establishing a secure quantum communication testbed.
iii. Defense Research & Development Organization (DRDO) has developed a 6-qubit quantum processor based on superconducting circuit technology in collaboration with Tata Institute of Fundamental Research (TIFR), Mumbai.
iv. Department of Space (DoS) has demonstrated Free-space Quantum Key Distribution over a distance of 300 meter with real-time processing and live exchanges of quantum-secured network.

v. Department of Atomic Energy (DAE) has developed a cold atom-based gravimeter at Raja Raman Centre for Advanced Technology, Madhya Pradesh.
vi. The Centre for Development of Telematics (C-DOT), under the Department of Telecommunications (DoT), has developed products integrating Quantum Key Distribution (QKD) and Post-Quantum Cryptography (PQC) technologies, and has also established a Centre of Excellence in Quantum Communication.

(c) Yes Sir. Under the National Quantum Mission, DST has launched a Call for Proposals for development of indigenous Quantum Algorithms. The call is open to researchers and academicians, with the last date for submission being 10th August 2025.

(d) Yes Sir, the Government has developed a clear vision, mission, and targets for the development of quantum technologies under the National Quantum Mission. The key objectives include:

i. Develop intermediate scale quantum computers with 20-50 physical qubits, 50-100 physical qubits and 50-1000 physical qubits in 3 years, 5 years and 8 years, respectively.
ii. Develop satellite based secure quantum communications between two ground stations over a range of 2000 kilometres within India as well as long distance secure quantum communications with other countries.
iii. Develop inter-city quantum key distribution over 2000 km with trusted nodes using wavelength division multiplexing on existing optical fibre.
iv. Develop multi-node Quantum network with quantum memories, entanglement swapping and synchronised quantum repeaters at each node (2-3 nodes).
v. Develop magnetometers with 1 femto-Tesla/sqrt(Hz) sensitivity in atomic systems and better than 1 pico-Tesla/sqrt(Hz) sensitivity in Nitrogen Vacancy-centers; Gravity measurements having sensitivity better than 100 nano-meter/second^2 using atoms and Atomic Clocks with 10^{-19} fractional instability for precision timing, communications and navigation.
vi. Design and synthesis of quantum materials such as superconductors, novel Semiconductor structures and topological materials for fabrication of quantum devices for quantum computing and communication.

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