GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
LOK SABHA
UNSTARRED QUESTION NO. 2939
ANSWERED ON 06/08/2025

RESEARCH AND DEVELOPMENT IN QUANTUM TECHNOLOGIES

2939. SHRI VISHNU DATT SHARMA:

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

(a) whether the Government is implementing the National Quantum Mission (NQM) to promote Research and Development in quantum technologies;

(b) if so, the status of the creation and functioning of the four Thematic Hubs (T-Hubs) under the mission along with the details of the institutions selected, milestones achieved, and timelines proposed; and

(c) if not, the reasons for delay and steps taken/being taken to operationalize these hubs effectively?

ANSWER
MINISTER OF STATE (INDEPENDENT CHARGE) OF THE MINISTRY OF SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)
विज्ञान और प्रौद्योगिकी तथा पृथ्वी विज्ञान मंत्रालय के राज्य मंत्री (स्वतंत्र प्रभार)
(डॉ. जितेंद्र सिंह)

(a) Yes, Sir, the Government is implementing the National Quantum Mission (NQM) to promote research, development, in quantum technologies with an outlay of ₹6003.65 crore for a period of eight years.

(b) to (c): Under the Mission, four Thematic Hubs (T-Hubs), each focusing on a specific domain of quantum technologies—Quantum Computing, Quantum Communication, Quantum Sensing & Metrology, and Quantum Materials & Devices—have been established in the financial year 2024–25, comprising of 14 Technical Groups having 17 Project Teams across 43 institutions. The list of institutions is placed at Annexure I. These hubs have been incorporated as Section-8 Companies by their respective host institutions and have constituted their respective Hub Governing Boards (HGBs) for effective governance and administration. Funds have been released to all four T-Hubs to initiate their operations. The hubs are now fully functional and are engaged in a range of activities including Technology Development, Human Resource Development, Entrepreneurship Development & Industry Collaboration and International Collaborations. The details of the Thematic Hubs are placed below:

S. No.	Technology Vertical	Name of the Host Institute	Name of the Section-8 Company
1.	Quantum Computing	Indian Institute of Science, Bengaluru	Foundation for QC Innovation
2.	Quantum Communication	Indian Institute of Technology, Madras in association with C-DoT, New Delhi	IITM CDOT Samgnya Technologies Foundation
3.	Quantum Sensing & Metrology	Indian Institute of Technology, Bombay	Qmet Tech Foundation
4.	Quantum Materials & Devices	Indian Institute of Technology, Delhi	QMD Foundation

The mission is for a period of eight years. However, the implementation broadly has three timelines, i.e. 3 years, 5 years and 8 years. Following are the key deliverables of the mission:

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.**

Annexure I

List of Institutions supported under National Quantum Mission (NQM)

S. No.	Institutes
1	Indian Institute of Technology, Delhi
2	Indian Institute of Technology, Kanpur
3	Indian Institute of Technology, Roorkee
4	Indian Institute of Technology, Bombay
5	Indian Institute of Technology, Madras
6	Indian Institute of Technology, Ropar
7	Indian Institute of Technology, Guwahati
8	Indian Institute of Technology, Patna
9	Birla Institute of Technology & Science Pilani, Hyderabad
10	The Institute of Mathematical Sciences, Chennai
11	Jaypee Institute of Information Technology, Noida
12	Society for Electronic Transaction and Security, Chennai
13	Centre for Development of Advanced Computing, Bengaluru
14	Indian Institute of Technology, Indore
15	Indian Institute of Science Education and Research, Thiruvananthapuram
16	Indian Institute of Science Education and Research, Pune
17	Raman Research Institute, Bengaluru
18	National Institute of Science Education and Research, Bhubaneswar
19	Tata Institute of Fundamental Research, Mumbai
20	Tata Institute of Fundamental Research, Hyderabad
21	Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru
22	Indian Institute of Technology, Kharagpur
23	Indian Institute of Technology, Bhilai
24	Indian Institute of Technology, Jammu
25	Indian Institute of Technology, Tirupati
26	Indian Institute of Science, Bengaluru
27	Indian Institute of Science Education and Research, Bhopal
28	Indian Institute of Science Education and Research, Mohali
29	Indian Institute of Space Science and Technology, Thiruvananthapuram
30	Centre for Development of Advanced Computing, Thiruvananthapuram

S. No.	Institutes
31	Indian Institute of Technology, Gandhinagar
32	TCG Centres of Research and Education in Science and Technology, Kolkata
33	Harish-Chandra Research Institute, Prayagraj
34	Indian Association for the Cultivation of Science, Kolkata
35	Birla Institute of Technology and Science, Goa
36	University of Hyderabad, Hyderabad
37	S.N. Bose National Centre for Basic Sciences, Kolkata
38	Indian Institute of Technology, Bhubaneswar
39	Indian Space Research Organisation, Ahmedabad
40	Solid State Physics Laboratory, Delhi
41	Indian Institute of Technology, Hyderabad
42	Centre for Development of Telematics, Delhi
43	Indian Space Research Organisation, Bengaluru

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