

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
RAJYA SABHA
UNSTARRED QUESTION NO. 444
ANSWERED ON 25/07/2024

NATIONAL QUANTUM MISSION

444. DR. ASHOK KUMAR MITTAL:

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

- (a) the specific goals and objectives of the National Quantum Mission and the expected timeline for achieving these goals;
- (b) the key areas of research and development that the mission will focus on;
- (c) the details of funds that have been allocated for the Mission; and
- (d) the manner in which this funding will be distributed across different research initiatives?

ANSWER

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

(a) The National Quantum Mission (NQM) 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 specific goals and objectives of the mission:

1. 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.
2. 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.
3. Develop inter-city quantum key distribution over 2000 km with trusted nodes using wavelength division multiplexing on existing optical fibre.
4. Develop multi-node Quantum network with quantum memories, entanglement swapping and synchronised quantum repeaters at each node (2-3 nodes).
5. 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/second² using atoms and Atomic Clocks with 10⁻¹⁹ fractional instability for precision timing, communications and navigation.
6. 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.

(b) The key areas of focus for the NQM are Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices.

(c) The National Quantum Mission was approved by the Union Cabinet at an outlay of Rs.6003.65 Crores for a period of eight years.

(d) The funds allocated for the Mission is for establishing four Thematic Hubs (T-Hubs) in four quantum technology areas namely Computing, Communication, Sensing & Metrology and Materials & Devices through an open call for proposals in the form of consortia. Each of these T-Hubs is required to undertake major activities viz. Technology Development, Human Resource Development, Entrepreneurship and startup ecosystem and international collaborations.
