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GS - III - SCIENCE & TECHNOLOGY

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QUANTUM MISSION ... COMMITMENT TO FUNDAMENTAL SCIENCE IS A GREAT BEGINNING!

Learning Space

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GS - III - SCIENCE & TECHNOLOGY

Science and Technology - developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

NEWS ARTICLE FOR REFERENCE

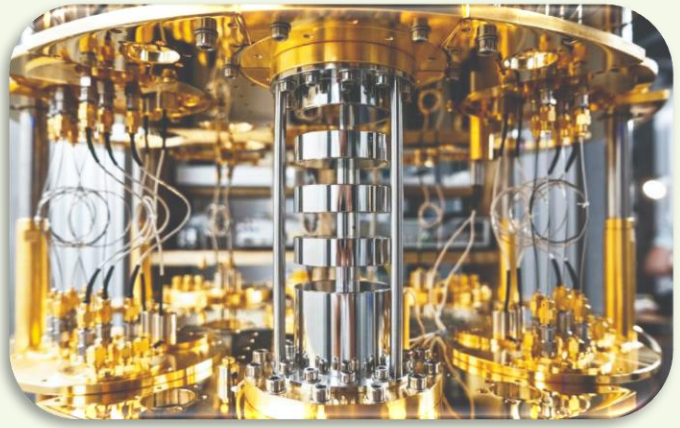
'Cabinet approves Rs. 6,000-cr National Quantum Mission' – Business Line – 20th April, 2023.

PROBABLE QUESTION

What do you understand by National Quantum Mission? Experts say that India's commitment to fundamental science is a great beginning. Discuss.

KEY WORDS

- ***National Quantum Mission***
- ***Research and Development***
- ***Quantum Computing***
- ***Physical Qubit***
- ***Topological Materials***
- ***Fabrication***



VARIOUS ASPECTS ABOUT THE NATIONAL QUANTUM MISSION

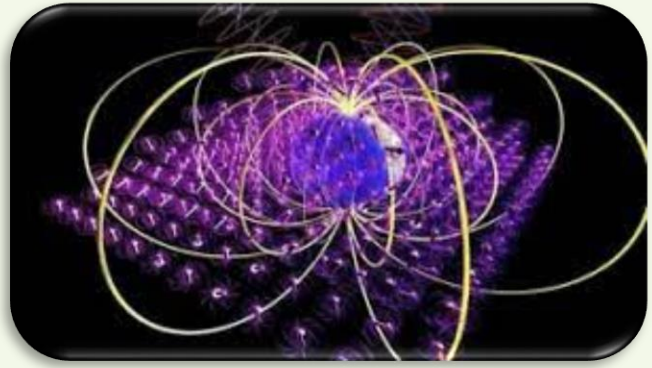
1 The mission will look at development of satellite-based secure communications between a ground station and a receiver located 3,000 km away during the first three years.

2 For satellite-based communication within Indian cities, the National Quantum Mission will lay communication lines using Quantum Key Distribution for over 2,000 km.

3 For long distances quantum communication, especially with other countries, tests will be conducted in the coming years.

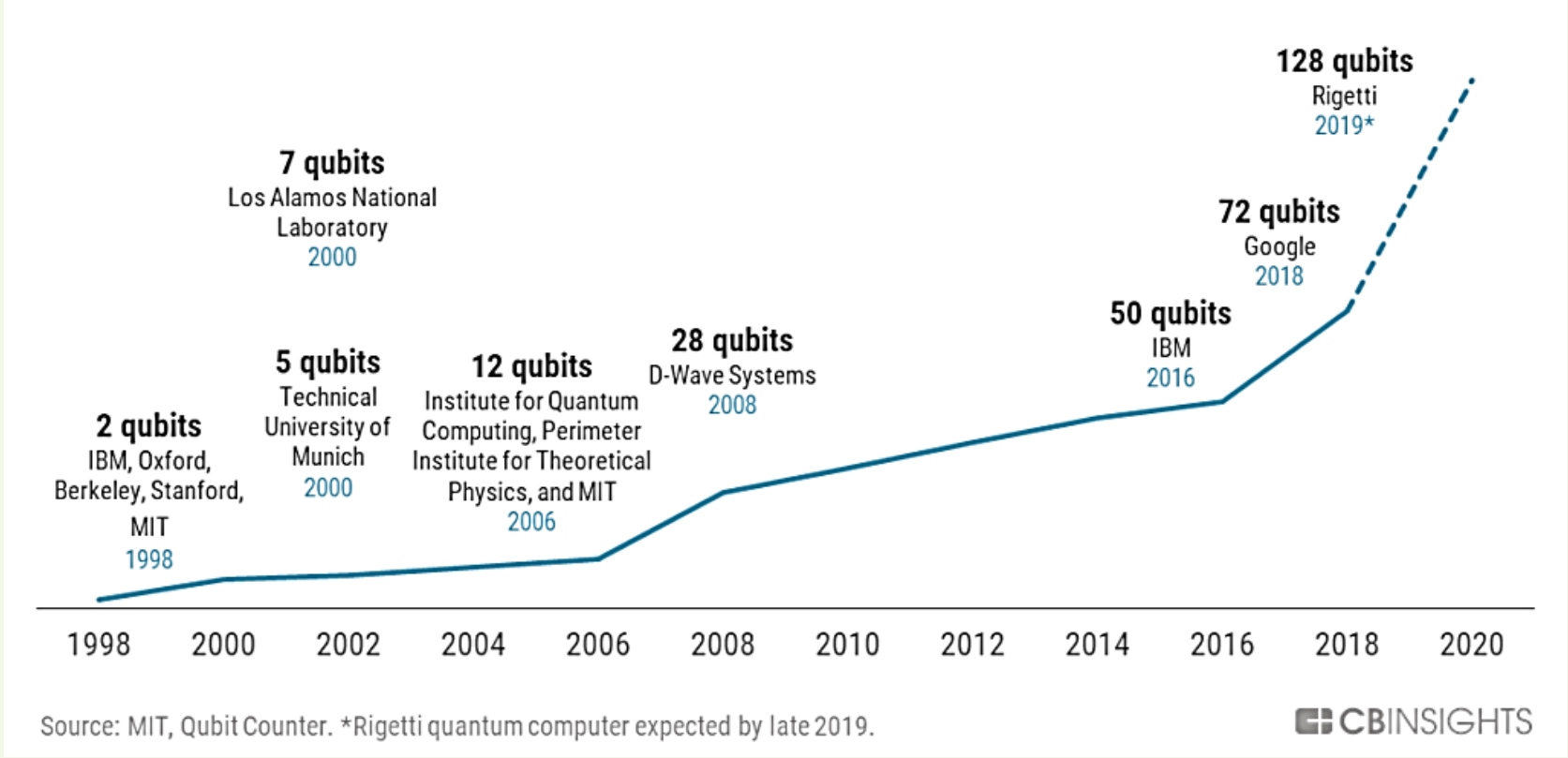
4 The mission will focus on developing quantum computers (qubits) with physical qubit capacities ranging between 50 and 1,000 qubits.

A GREAT BEGINNING … WHAT ABOUT SKILLED MANPOWER!



It will have wide-scale applications ranging from healthcare and diagnostics, defence, energy and data security.

SEE THE SCENARIO OF INCREASE IN QUBITS!



VARIOUS ASPECTS ABOUT THE NATIONAL QUANTUM MISSION

9 There are some 20-odd institutes that are carrying out research on quantum computing, apart from some private players, and on a long-term perspective some of these institutes can be included under the National Quantum Mission, if need be.

5 Computers up to 50 physical qubits will be developed over three years, 50-100 physical qubits in five years and computers up to 1,000 physical qubits in eight years.

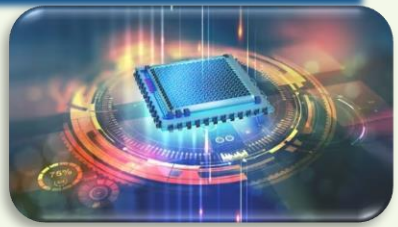
A GREAT BEGINNING … WHAT ABOUT SKILLED MANPOWER!

6 It will develop four broad themes:

- ✓ Quantum Computing.
- ✓ Quantum Communication.
- ✓ Quantum Sensing and Metrology.
- ✓ Quantum Material and Devices.

8 Department of Science and Technology will lead the quantum mission, supported by four to five other departments.

7 A hub for each will be established at research institutes and R&D centres, who are already working in this field of research.



VARIOUS ASPECTS ABOUT THE NATIONAL QUANTUM MISSION

13 They will focus on generation of new knowledge through basic and applied research as well as promote R&D in areas that are mandated to them.

Magnetometer is the instrument used for measuring the strength and sometimes the direction of magnetic fields.

A GREAT BEGINNING … WHAT ABOUT SKILLED MANPOWER!

India's commitment to fundamental science is a great beginning!

10 The Mission will help develop magnetometers with high sensitivity in atomic systems, atomic clocks for precession timing, communications and navigation.

11 Fabrication of quantum materials such as superconductors, novel semiconductor structures and topological materials for fabrication of quantum devices is also part of the mission.

12 Four 'Thematic Hubs' (T-Hubs) will be set up in top academic and national R&D institutes in the domains of quantum computing, quantum communication, quantum sensing and metrology, and quantum materials and devices.

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