

Budget 2020 announces Rs 8000 cr National Mission on Quantum Technologies & Applications

The government in its budget 2020 has announced a National Mission on Quantum Technologies & Applications (NM-QTA) with a total budget outlay of Rs 8000 Crore for a period of five years to be implemented by the Department of Science & Technology (DST).

Finance Minister Smt. Nirmala Sitharaman in Union Budget 2020 speech said that the new economy is based on innovations that disrupt established business models. Artificial intelligence, Internet-of-Things (IoT), 3D printing, drones, DNA data storage, quantum computing, etc., are re-writing the world economic order.”

“Quantum technology is opening up new frontiers in computing, communications, cyber security with wide-spread applications. It is expected that lots of commercial applications would emerge from theoretical constructs which are developing in this area. It is proposed to provide an outlay of ` 8000 crore over a period five years for the National Mission on Quantum Technologies and Applications,” she added.

Quantum technologies are rapidly developing globally with a huge disruptive potential. The next generation transformative technologies that will receive a push under this mission include quantum computers and computing, quantum communication, quantum key distribution, encryption, crypt analysis, quantum devices, quantum sensing, quantum materials, quantum clock and so on. The areas of focus for the Mission will be in fundamental science, translation, technology development, human and infrastructural resource generation, innovation and start-ups to address issues concerning national priorities.

Their applications which will receive boost include those in aero-space engineering, numerical weather prediction, simulations, securing the communications & financial transactions, cyber security, advanced manufacturing, health, agriculture, education and other important sectors with focus on creation of high skilled jobs, human resources development, start-ups & entrepreneurship leading to technology lead economic growth.

केन्द्रीय वजट
UNION BUDGET 2020

Budget 2020 announced Rs 8,000 crore over the next 5-yrs in the National Mission on Quantum technology and its applications

- The areas of focus for the NM-QTA Mission will be in fundamental science, translation, technology development and towards addressing issues concerning national priorities
- The mission can help prepare next generation skilled manpower, boost translational research and also encourage entrepreneurship and start-up ecosystem development.
- Quantum principles will be used for engineering solutions to extremely complex problems in computing, communications, sensing, chemistry, cryptography, imaging and mechanics

Their applications which will be boosted include those in aero-space engineering, numerical weather predictions, simulations, securing the communications & financial transactions, cyber security, advanced manufacturing, health, agriculture, education

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The range of quantum technologies is expected to be one of the major technology disruptions that will change entire paradigm of computation, communication and encryption. It is

perceived that the countries who achieve an edge in this emerging field will have a greater advantage in garnering multifold economic growth and dominant leadership role.

The transition of quantum science and technology from a field of active interest in research laboratories to one that can be applied in day to day life is also the opportune moment that provides the space for many startup companies to form and develop. The Mission draws upon the existing deep strengths within academic institutes across India to support interdisciplinary research projects in key verticals involving quantum technology, while simultaneously developing key foundational strengths in important core areas. QT research, operational implementations, Human resource availability and technology development are in rudimentary stage.

It has become imperative both for government and industries to be prepared to develop these emerging and disruptive technologies in order to secure our communications, financial transactions, remain competitive, drive societal progress, generate employment, foster economic growth and to improve the overall quality of life.

The Mission will be able address the ever increasing technological requirements of the society, and take into account the international technology trends and road maps of leading countries for development of next generation technologies.

Implementation of the mission would help develop and bring quantum computers, secured communications through fibre and free space, quantum encryption and crypt-analysis and associated technologies within reach in the country and help address India specific national and regional issues.

The mission will help prepare next generation skilled manpower, boost translational research and also encourage entrepreneurship and start-up ecosystem development. By promoting advanced research in quantum science and technology, technology development and higher education in science, technology and engineering disciplines India can be brought at par with other advanced countries and can derive several direct and indirect benefits.

Quantum Technology is based on the principles of quantum theory, which explains the nature of energy and matter on the atomic and subatomic level. It concerns the control and manipulation of quantum systems, with the goal of achieving information processing beyond the limits of the classical world. Quantum principles will be used for engineering solutions to extremely complex problems in computing, communications, sensing, chemistry, cryptography, imaging and mechanics. Quantum field has not yet matured for commercialization, due to the extreme scientific challenges involved.

Quantum computers store and process information using quantum two level systems (quantum bits or qubits) which unlike classical bits, can be prepared in superposition states. This key ability makes quantum computers extremely powerful compared to conventional computers when solving certain kinds of problems like finding prime factors of large numbers and searching large databases. The prime factorization quantum algorithm has important implications for security as it can be used to break RSA encryption, a popular method for secure communication. Indian physicists and engineers are preparing for a deep dive into the quantum world that holds the secrets for developing exciting technologies for computing, communication, cryptography and many more.

With a solid research base and workforce founded on significant and reliable government support, it can lead to the creation of innovative applications by industries, thereby stimulating economic growth and job creation, which will feed back into a growing quantum-based economy. The government's financial and organizational support will also ensure that both public and private sectors will benefit. It will establish standards to be applied to all research and help stimulate a pipeline to support research and applications well into the future.