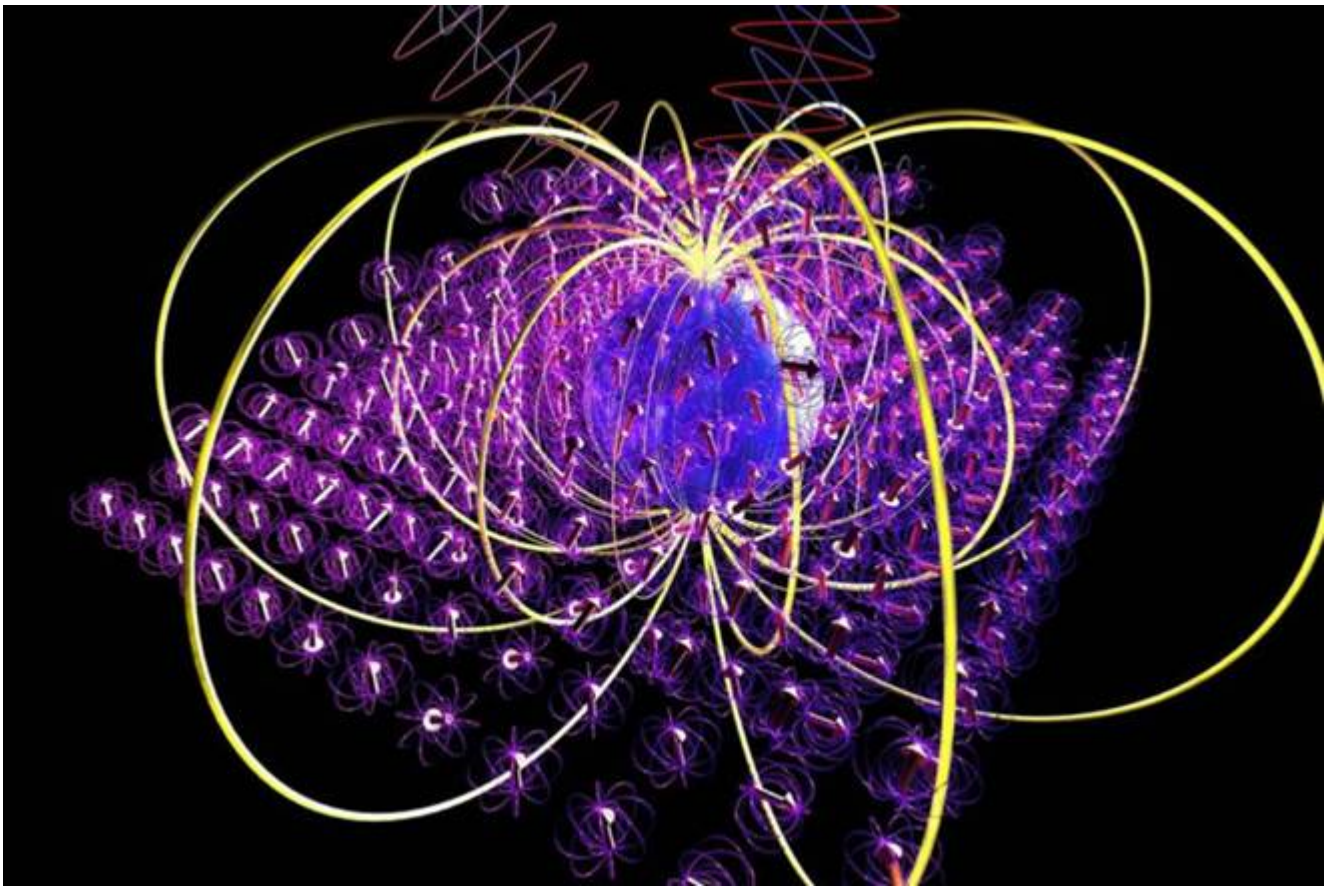
Quantum technology gets a big boost in India

Indian physicists 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

By: IANS | Benagaluru | Published: May 9, 2018 11:34 AM



Quantum technology gets a big boost in India (Image: warontherocks.com)

Thanks to government funding, Indian physicists 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. Schemes for making India a major player in quantum technologies were deliberated during a five-day international conference on “Quantum Frontiers and Fundamentals” at the Raman Research Institute (RRI) here.

Sponsored by the John Templeton Foundation, the philanthropic organisation in the US, it was attended by eminent physicists from India and abroad, including several research students from India with a total number of around 100 participants, reflecting the significant growth in the research community in this area in our country.

“This is an interesting conference, blending quantum fundamentals aspects with applications, and is unique in its mandate as we have tried to provide equal emphasis to both theoretical research and experimental quantum technologies,” Urbasi Sinha, of RRI and organiser of the conference, told this correspondent. Dipankar Home of the Bose Institute, Kolkata, and Alexandre Matzkin of the French National Center for Scientific Research (CNRS) in Paris were the co-organisers.

Quantum physics is a basic theory in physics that deals with the behaviour of matter and light on the atomic and subatomic scale. Quantum technology exploits the weird properties of quantum mechanics – especially quantum entanglement, quantum superposition and quantum tunnelling – into practical applications for computing, cryptography and “secure” communication. Quantum computers that process “quantum data” (instead of binary data) are predicted to be faster than today’s largest classical computer.

Research in these areas at Indian laboratories has received a boost with promised funding support from the government’s Department of Science and Technology (DST) and the Indian Space Research Organisation (ISRO), as well as small individual projects from the Defence Research and Development Organisation and the Prime Minister’s Office.

The DST’s Mission-Mode scheme, called “Quantum Science and Technology (QuST)”, will fund research “for the development and demonstration” of quantum computers, quantum communication and cryptography, besides “demonstration of quantum teleportation”. The scheme, DST says, “promises to revolutionise the future computation and communication systems which will ultimately have a huge impact on the nation and our society as a whole”.

The DST initiative has received an overwhelming response and “has already received 128 proposals from researchers from different parts of the country,” Rajeev Sharma, a

spokesperson for the scheme at DST, told this correspondent. “Funding is no problem,” he said.

ISRO, in collaboration with RRI, has initiated a mega project called “Quantum Experiments Using Satellite Technology (QUEST)”. Sinha, along with members of her “Quantum Information and Computing Lab” and theory colleagues at RRI, will play a key role in developing these technologies in the coming years, with support from ISRO.

“Once RRI is ready with an experimental payload, we will launch it on board one of our satellite missions,” M. Sankaran, deputy director of ISRO Satellite Centre in Bengaluru and one of the conference participants, told this correspondent. According to Sinha, one of her first experiments “will be a collaborative effort with the ‘Quantum Photonics Lab’ at Ontario’s University of Waterloo” that will aim to establish “a secure Quantum Key Distribution link” between India and Canada.

“It is good that both DST and ISRO have decided to fund research in this important area,” said Arun Kumar Pati, a leading researcher in quantum physics at the Harish Chandra Research Institute in Allahabad and a conference participant. “We are 10 years behind and have to catch up.” Using its world’s first quantum satellite called “Micius”, China had already demonstrated transmission of images from the country to Austria and researchers at the National University of Singapore had built a nano-satellite with a quantum communication payload. Scientists of the University of Waterloo have also demonstrated the first quantum key distribution transmissions from a ground transmitter to a quantum payload on a moving aircraft. The conference suggested the formation in India of a society for quantum information scientists. It also called for greater thrust to experimental research and an increase in the pool of researchers in the area of quantum technologies.

By K.S. Jayaraman

(K.S. Jayaraman is a veteran science journalist. He can be contacted at killugudi@hotmail.com)