

DRDO develops Quantum Random Number Generator (QRNG)

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In news

Recently, the DRDO Young Scientist Laboratory for Quantum Technologies (DYSL-QT), a DRDO facility based in Mumbai, has developed a QRNG

About the Quantum Random Number Generator (QRNG)

- The Quantum Random Number Generator (QRNG) developed by the Defence Research and Development Organisation (DRDO) facility has the ability to detect random quantum events and convert those into a stream of binary digits.
- The facility has developed a fiber-optic branch path based QRNG
- This branch path based QRNG depends on the principle that if a single photon falls on a balanced beam splitter, it will take either of the beam-splitter output paths randomly.
- As the path chosen by the photon is random, the randomness is translated to a sequence of binary digits, also called bits.
- The generation of perfect randomness is generally considered impossible with classical methodologies.
- Quantum mechanics has the inherent potential of providing true random numbers and thus has become the preferred option for scientific applications requiring randomness.
- As per the Defence Ministry, The QRNG system developed by the laboratory (DYSL-QT) has passed the global randomness testing standards of NIST and Die-harder Statistical Test Suites at the speed of around 150 kbps after post-processing. The generated random numbers are

also evaluated and verified using DRDO's indigenously developed Randomness Testing Statistical Test Suite of SAG.

Applicability of Random numbers

Random numbers have essential roles in various fields ranging from quantum communication, cryptography applications like key generation, key wrapping, authentication along with scientific simulations, lotteries and fundamental physics experiments

Significance

With the development of QRNG system, India enters the club of countries which have the technology to achieve the generation of random numbers based on the Quantum Phenomenon

What is quantum technology?

- Quantum technology is an emerging field of physics and engineering, which relies on the principles of quantum physics.
- Quantum Technologies concerns the study, control and manipulation of quantum principle- based systems with the goal of achieving information processing, secure communication and superior sensors beyond the limits of the classical systems.

About DRDO Young Scientist Laboratory for Quantum Technologies (DYSL-QT)

- This facility is one of the five YSLs (Young Scientist Laboratories) of the DRDO which are working on five different technologies.
- The other facilities are Artificial Intelligence (DYSL-AI) Bengaluru, Cognitive Technologies (DYSL-CT) Chennai, Asymmetric Technologies (DYSL-AT) Kolkata, Smart Materials (DYSL-SM) Hyderabad.
- These five facilities were dedicated to the nation by

Prime Minister Narendra Modi in January 2020.