

Quantum Key Distribution

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In news— Recently, a team of scientists from DRDO and IIT Delhi have successfully demonstrated Quantum Key Distribution (QKD) link **between Prayagraj and Vindhyachal in Uttar Pradesh**, a distance of more than 100 kilometers.

About Quantum Key Distribution (QKD)-

- It is primarily **a mechanism to undertake secure communication which utilizes a cryptographic protocol** involving various components of quantum mechanics.
- It **enables two communicating sides to come up with random secret keys shared by both of them and known exclusively to them**, so only they can use it to encrypt and decrypt messages, thus achieving a very highly-secure communication.
- **QKD works by transmitting many light particles, or photons, over fiber optic cables between parties.**
- An important and **unique property of QKD** is the ability of the two communicating users to **detect the presence of any third party** trying to gain knowledge of the key.
- This results from a fundamental aspect of quantum mechanics: the process of measuring a quantum system in general disturbs the system.
- **The recent test by DRDO was achieved over a commercial-grade optical fiber already available in the field.**
- With this success, the country has demonstrated indigenous technology of secure key transfer for bootstrapping military-grade communication security key hierarchy.
- **In December 2020, the technology was tested** for communication between two DRDO facilities in Hyderabad the Defence Research and Development Laboratory (DRDL) and Research Centre Imarat (RCI) over a distance of 12

km.

- The technology is expected to help define standards and formulate crypto technology-related policies that can use the QKD system in a unified Cipher Policy Committee (CPC) framework.

What is Quantum technology?

- It is an emerging field of physics and engineering, based on the principles of Quantum mechanics developed in the early 20th century to describe nature at the scale of atoms and elementary particles.
- Quantum technology is manifested through applications in secure communication, disaster management through better prediction, computing, simulation, chemistry, healthcare, cryptography, imaging among others.

What is cryptography?

- Cryptography, or cryptology, is the practice and study of techniques for secure communication in the presence of adversarial behavior.
- It allows only the sender and intended recipient of a message to view its contents.

Further

reading:

<https://journalsofindia.com/safety-in-secure-quantum-communication-platforms/>