

ONLINE CSSTEAP SHORT COURSE

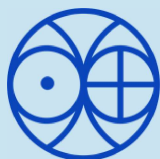
ON

Free-Space Quantum Communication

July 27 – 31, 2026

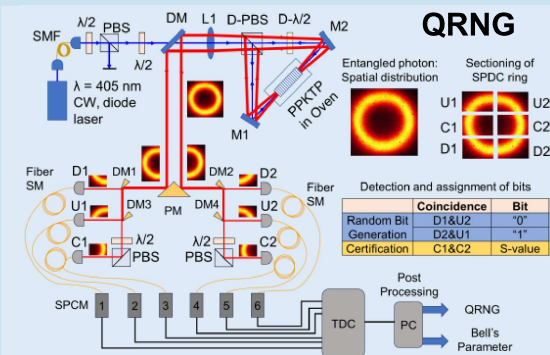
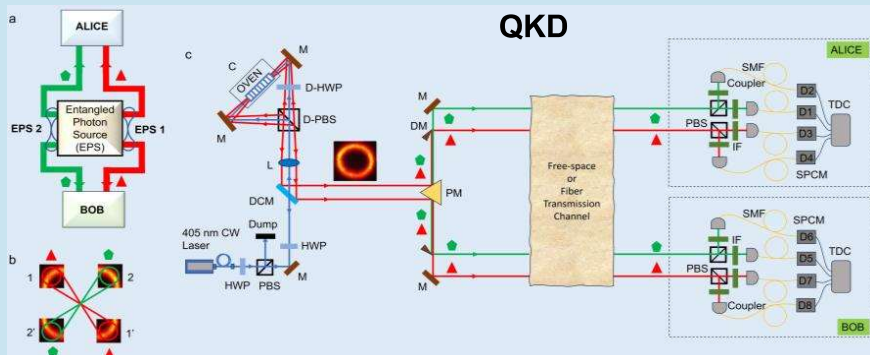
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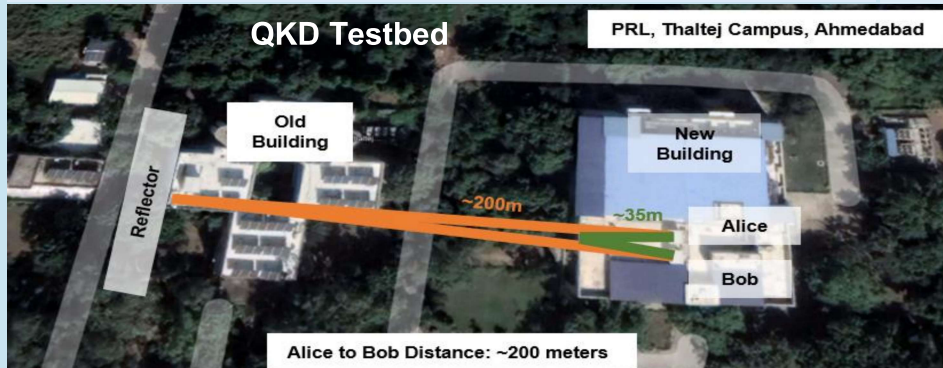
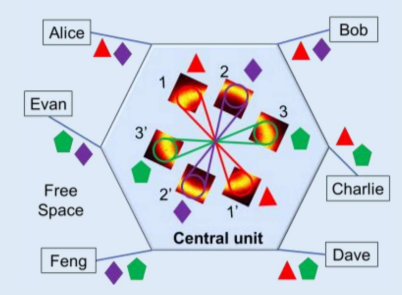


Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP)
(Affiliated to the United Nations)
IIRS Campus, 4, Kalidas Road, Dehradun, India
www.cssteapun.org

Physical Research Laboratory (PRL)
(A Unit of Dept. of Space, Govt. of India)
Navrangpura, Ahmedabad, India
www.prl.res.in



Multi-party QKD network



Introduction

Our present-day communication network and the internet are based on optical communication, which is not secure against hacking. The information and the encryption keys are sent as classical bits -- a stream of electrical or optical pulses representing 1s and 0s. Smart hackers can read and copy bits in transit without leaving a trace. However, using quantum communication and quantum key distribution (QKD), one can make it secure since the laws of quantum mechanics deny copying of quantum states used for communication.

The development of quantum communication over free space opens a pathway to the secure global quantum internet. Unlocking the full quantum advantage in global-scale networks is still an ongoing challenge, and capacity building of skill and human resource is highly required to extend the reach of individual quantum links.

In recent past, PRL has successfully demonstrated free-space quantum communication between two parties, separated by 200 m.

Objective of the Course

As the field of free-space quantum communication continues to evolve rapidly, there is an increasing demand for people with the required knowledge and skills to tackle the complex challenges and opportunities it presents. The objective of the course is to create an awareness and develop an understanding of the fundamental and current technological trends in this field.

Course Contents

1. Basics of quantum mechanics
2. Introduction to quantum optics
3. Quantum states and their superposition
4. Single photon sources
5. Producing entangled photons and verifying their entanglement
6. Quantum key distribution (QKD) and popular QKD protocols
7. Free-space quantum communication

Eligibility & How to Apply

The course is aimed towards professionals, academicians, researchers and students.

Applicants should have a Master's degree in Physics, Mathematics or other equivalent subjects, OR a 4-year Bachelor's degree (B.E/B.Tech.) in (Electrical, Optical, Electronics & Communication, Computer) Engineering, Information Technology or any other allied field. Since the whole course will be conducted in English, the applicant should have proficiency in the English language.

Applicants should apply online through the CSSTEAP website

<https://admissions.cssteapun.org/login>

Announcement of Course: May 11, 2026

Application Deadline: June 30, 2026

In case of any difficulties while submitting the online application form, please contact websupport@iirs.gov.in through e-mail.

Link for lectures will be shared with selected applicants in due course. Applicants are advised to check the website www.cssteapun.org regularly for further updates and information.

About CSSTEAP

CSSTEAP was established in India in November 1995 with its headquarters at IIRS, Dehradun. The centre has emerged as a Centre of Excellence in capacity building in the field of space science and technology applications. For more information, visit www.cssteapun.org

About PRL

Known as the cradle of Space Sciences in India, the Physical Research Laboratory (PRL) was founded in 1947 by Dr. Vikram Sarabhai. As a unit of the Department of Space, Government of India, PRL carries out fundamental research in Astronomy and Astrophysics, Space and Atmospheric Sciences, Solar Physics, Geosciences, Planetary Science, Atomic, Molecular & Optical Physics, Theoretical Physics & Cosmology. For more information, visit www.prl.res.in

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