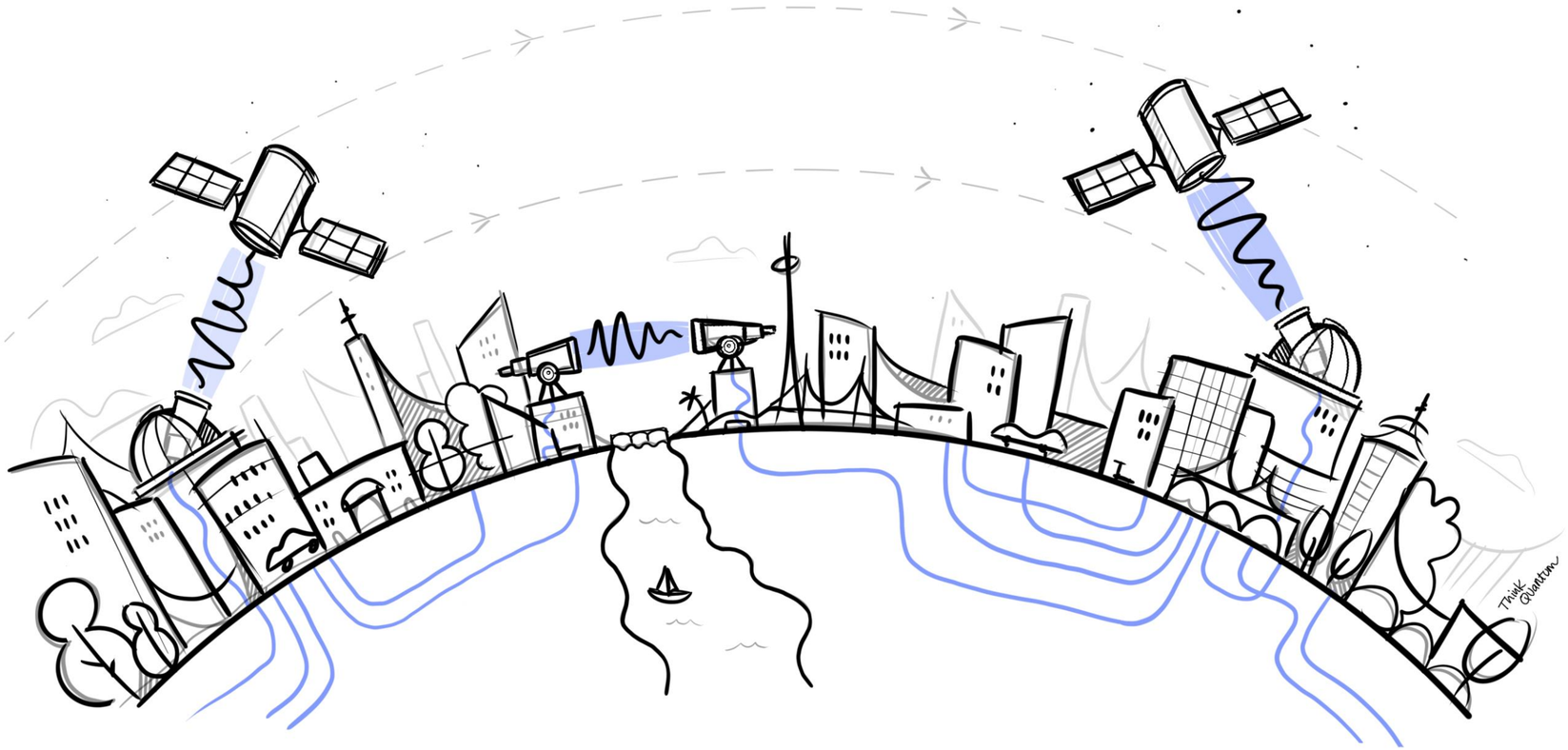
ThinKQUANTUM

OPTICAL AND QUANTUM TECHNOLOGIES FOR CYBER SECURITY



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SPINOFF AND STARTUP COMPANIES ON PHOTONICS IN ITALY

PoliHub Milano
19 January 2024

The company

ThinkQuantum is a startup and spinoff company from University of Padova that commercialize solutions for **cyber security** based on **quantum technologies.**

It was founded joining the **expertise** of the **university's research group** and the **industrial capabilities of Officina Stellare**.

The **University** group has **more than 20 years of experience** in the field of **quantum information processing and quantum communications** in fibers, free-space and satellites

Officina Stellare is a company **leader** in the design and development of **telescopes** and **optomechanical** systems for **observation**, **laser communication and defense** applications on **ground and space**

What we do? And why?

We provide solutions, based on quantum technologies, that allows to protect data with the highest level of security.

The common encryption systems used today are **based on public key cryptography**, such as **RSA, which are hard to solve mathematical problems**

Unfortunately, Quantum Computers have the ability to **break these protocols,** completely **compromising the security** of the transmitted **information**

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ZDNet

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MUST READ: APPLE, GOOGLE TAKE SIMILAR PHONE ADDICTION APPROACHES WITH IOS, ANDROID

IBM warns of instant breaking of encryption by quantum computers: 'Move your data today'

Welcome to the future transparency of today as quantum computers reveal all currently encrypted secrets -- a viable scenario within just a few years

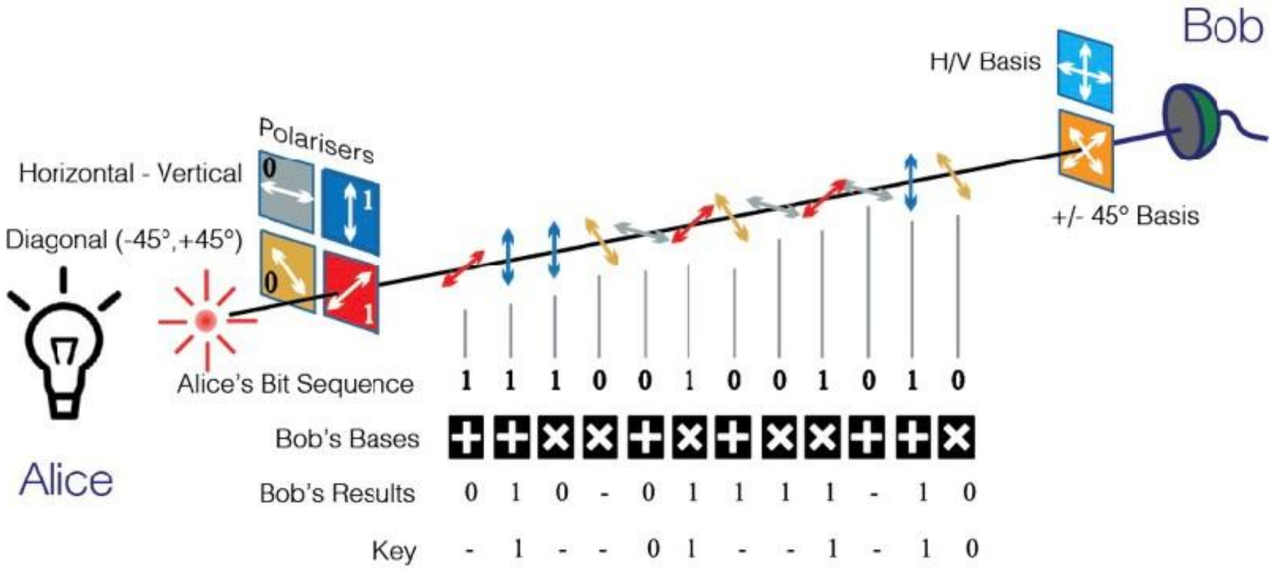
By Tom Foremski for Tom Foremski: RHIO | May 18, 2018 -- 18:24 GMT (11:24 PDT) | Topic: Security

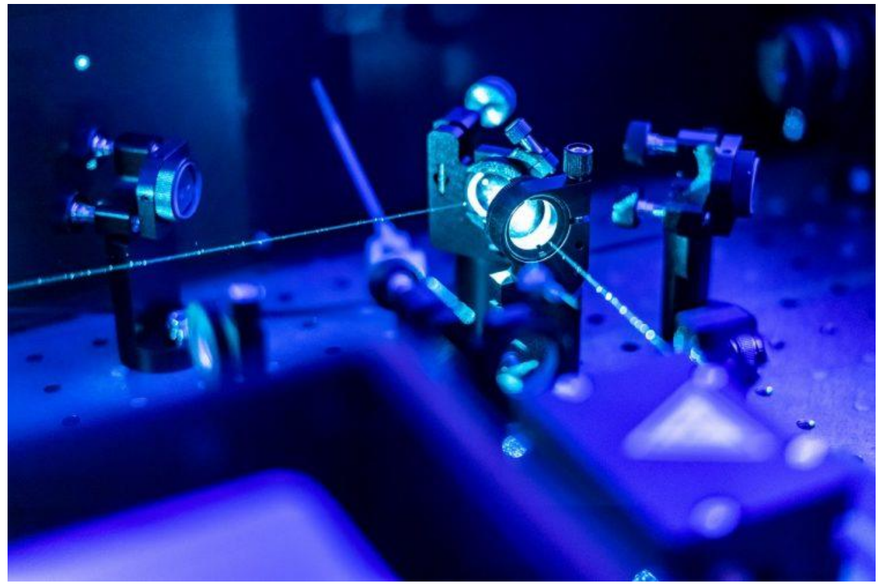
How? Quantum Key Distribution in a nutshell

Quantum Key Distribution is a **protocol** to generate **perfectly secure** identical **keys** between two **distant users**

It **works** by **exchanging single quantum particles of light** via **fiber**, **free-space or satellite** channels

Relies on the laws of physics and **not** on hard **mathematical problems**





Main tricks:

- Single **quantum particles cannot be cloned**
- Any **interaction** of an **attacker** modify the system and **adds errors**

Secure against any type of attacks, not only Quantum Computers

Products & Technology

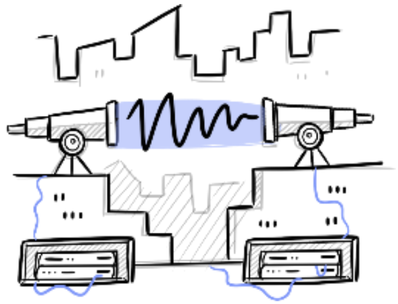
Quantum Key Distribution system:

A stable and robust **QKD system for fiber, free space and satellite** links exploiting the **polarization** of **single photons**

QuKy

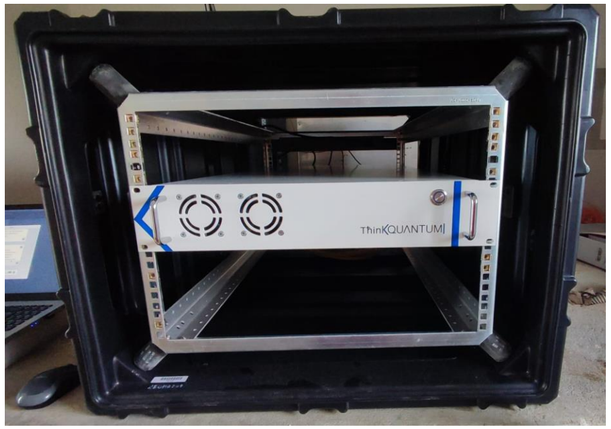
The Quantum Key Distribution Platform by ThinkQuantum

Fiber



Free-space

Satellite



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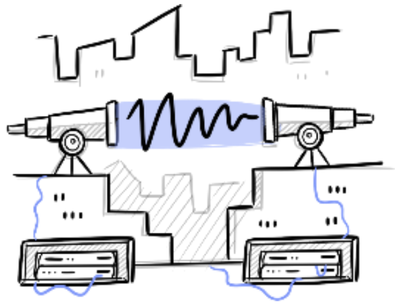
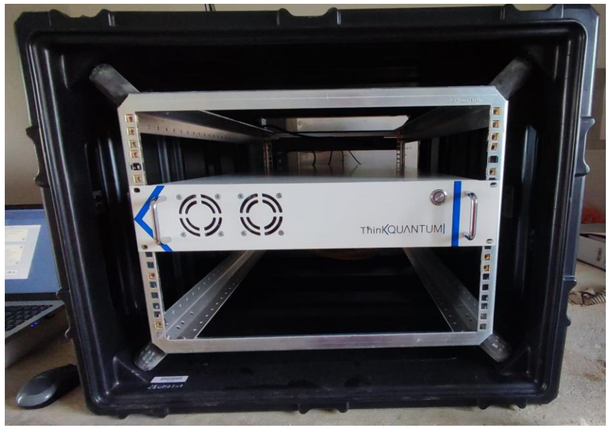


Free-space

Satellite



Fast and secure Quantum Random Number Generator based on Source-DI protocol:

Security from **Heisenberg uncertainty** principle.

Stand Alone version (Rack and benchtop)

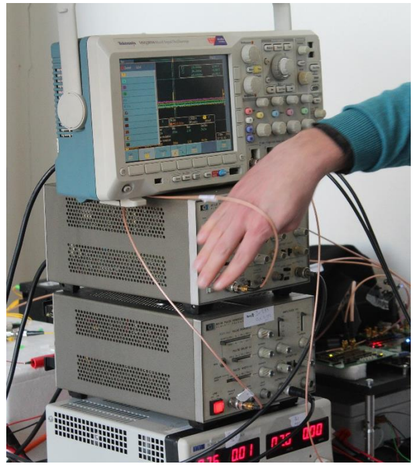
ThiKe

The Source of True Quantum Randomness by ThinkQuantum

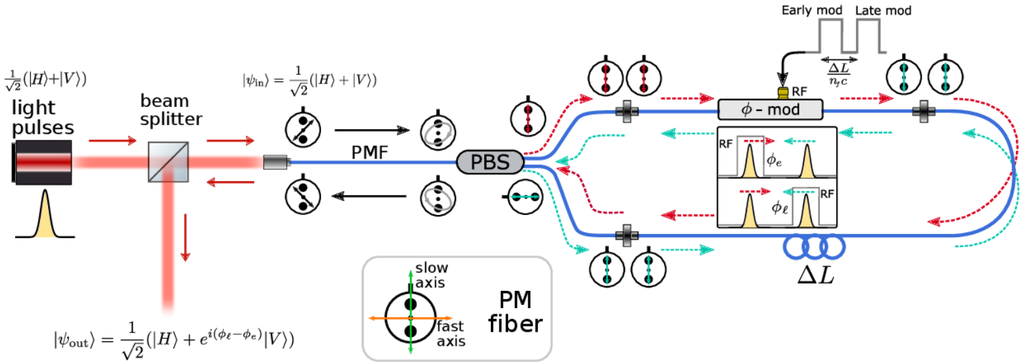
OEM version

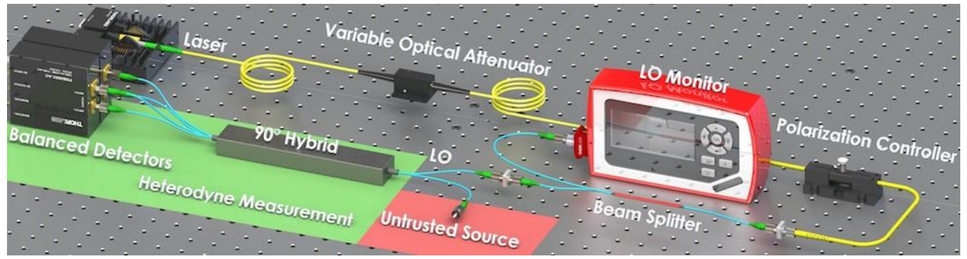
Opportunities and challenges

The first QKD experiments in the university were done in 2017 and the company was born in 2021

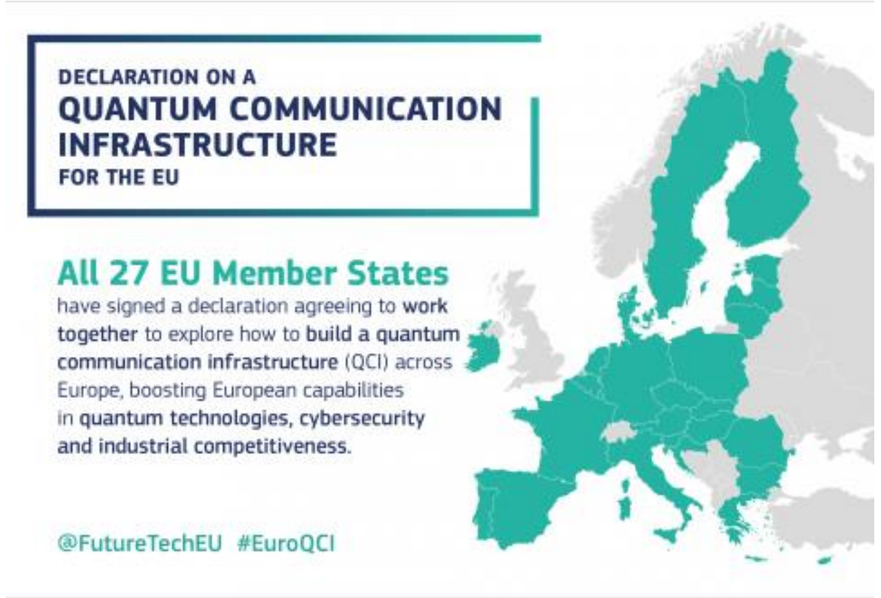


The research activities in the university allowed us to research, experiment, FAIL (multiple times) and build knowledge and innovative solutions (patented) that make our products unique





Opportunities and challenges



Timing: the market evolved rapidly! With **EuroQCI all 27 member states** needed **EUROPEAN QKD systems** for designing and building the **national and international Quantum Communication Infrastructure.**

In May 2022 we presented the **commercial QKD and QRNG systems** to the market.

The collaboration, the expertise and the access to the facilities of both University and Officina Stellare have been fundamental to industrialize 2 prototypes into commercial products in less than a year!

Now we are a supplier of several of the EU member states and other private companies.
Next challenge scale up the production!

Involved in several **ESA & Horizon** projects:

QSN PARTNERSHIP

QUDICE QUantum Devices and subsystems for Communications in spacE

GAOM OTQI

CYBER 4.0 CYBERSECURITY COMPETENCE CENTER

QU- PILOT

QUID QUANTUM ITALY DEPLOYMENT

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