Call 2021
Final Evaluation

QUANTERA
RESEARCH FUNDERS FOR QUANTUM TECHNOLOGIES

QUANTERA
DECADE OF IMPACT 2016-2026

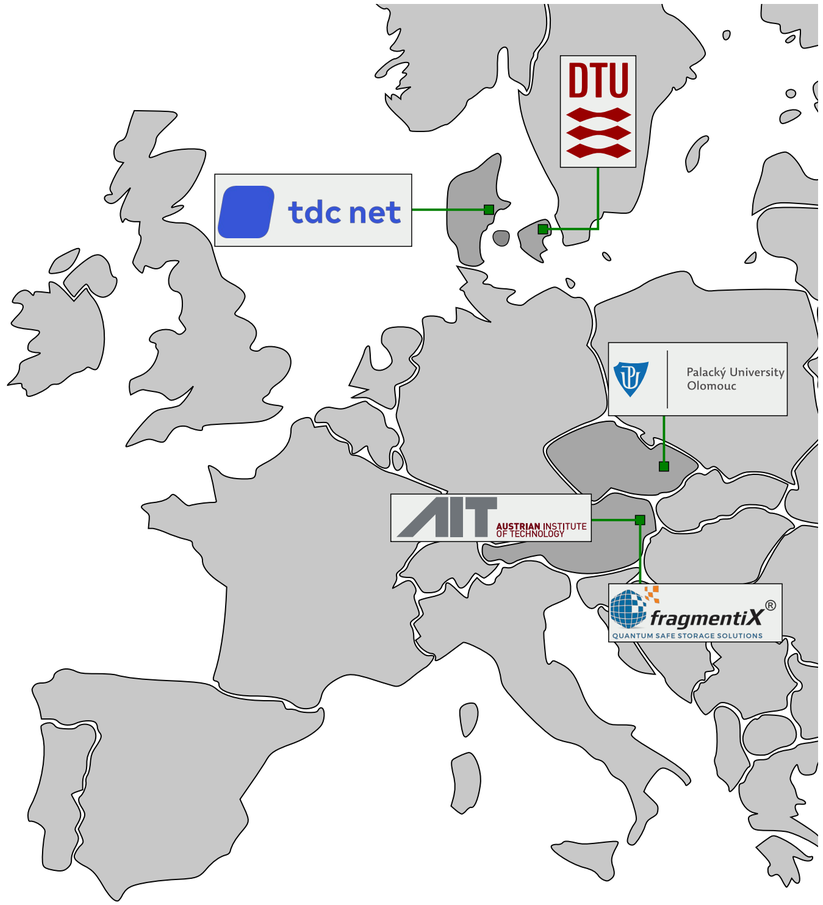
CVSTAR

Continuous-Variable Multi-User Quantum Key Distribution for 5G and distributed storage applications

Website:
https://quantera.eu/cvstar/

Tobias Gehring

COLLABORATION (overview)



Academic
- DTU (Denmark)
- Palacky University Olomouc (Czech Republic)

RTO
- Austrian Institute of Technology (Austria)

Companies
- TDC NET (Denmark) — telecom operator
- FragmentiX (Austria) — storage solution provider



Consortium meeting
Porto, Portugal
August 2024

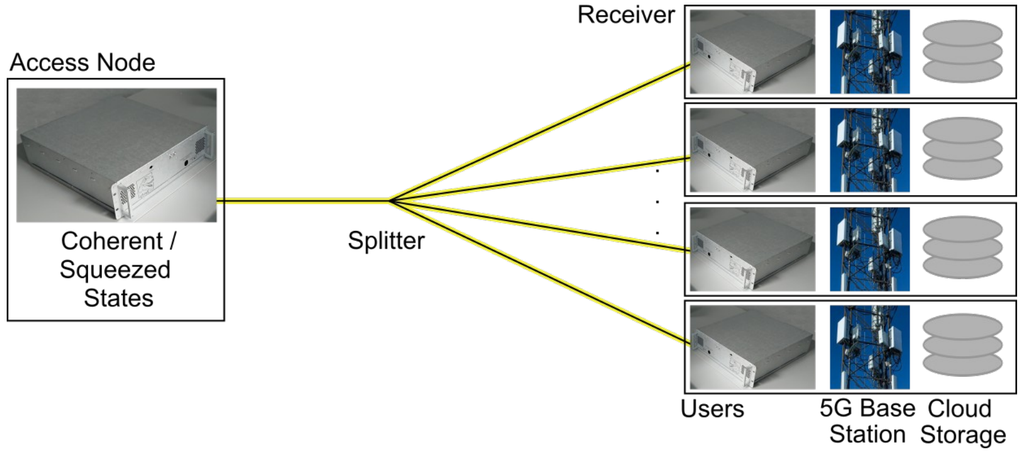
SUCCESS STORY (highlights)

CHALLENGE

- Multi-user quantum key distribution protocols
  - Theory and Experiment
- Demonstration of use-cases in existing telecom infrastructure:
  - Encrypting fronthaul traffic of current 5G and future 6G mobile networks
  - Information theoretical secure and redundant distributed data storage

SOLUTION

QKD in passive optical networks

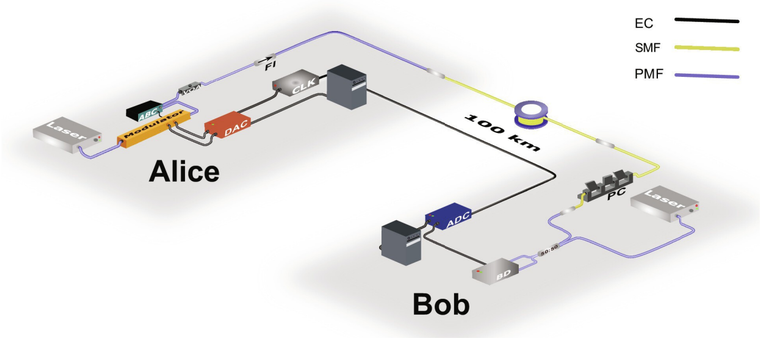


- no trust between users
- users trust each other

SUCCESS STORY (highlights)

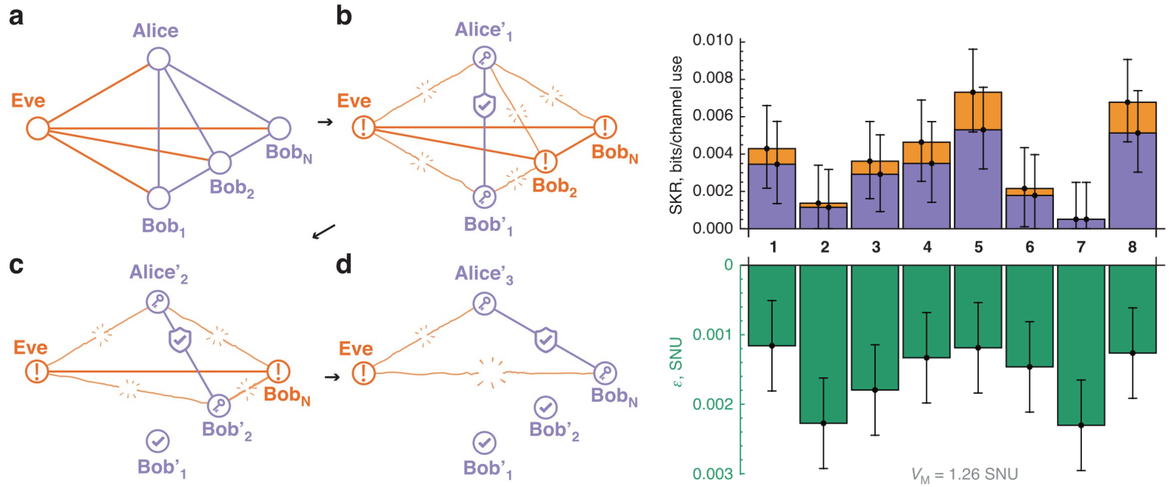
IMPLEMENTATION

1) Extend the reach of CV-QKD
— 100 km achieved



Science Advances 10, eadi9474 (2024)

2) New protocol for trusted user scenario + experiment

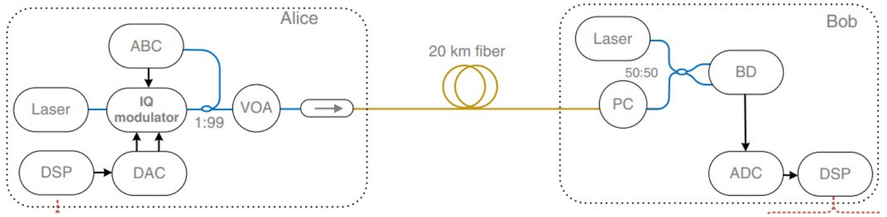


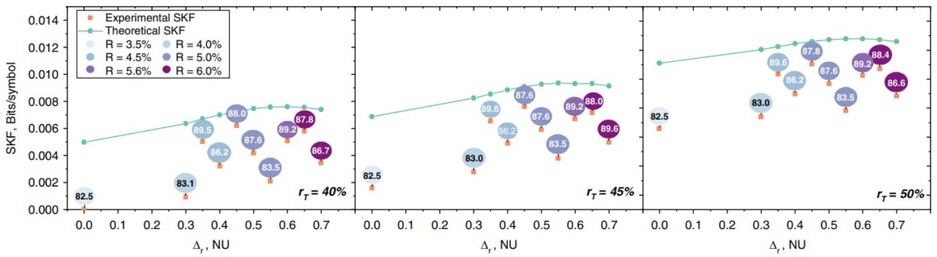
Nature Light: Science and Applications 13, 291 (2024)

SUCCESS STORY (highlights)

IMPLEMENTATION

3) Discrete modulated CV-QKD with composable security





Nature Light: Science and Application 14, 255 (2025)

4) Use-case demo at TDC NET



SCIENTIFIC OUTPUTS

PUBLICATIONS AND PRESENTATIONS – 43 publications, many presentations (highlights: 2x Light: Science and Applications, 1x Science Advances)

PATENTS – 2 filed

NUMBER OF PhD THESES – 4

IMPACT (potential users)

- RELEVANT **INDUSTRY BRANCH** – critical infrastructure, government, health, energy supply, defense, finance, …
- KEY COMMERCIALLY RELEVANT **APPLICATIONS** – secure data transfer and storage
- EXISTING/POTENTIAL **END USERS** – the Danish government
- COOPERATION WITH THE **QUANTUM FLAGSHIP** OR OTHER QUANTUM INITIATIVES – QSNP

Product extensions based on project results

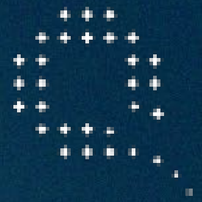
fragmentiX®
QUANTUM AGE CYBERSECURITY

Formation of spin-off (out of DTU)

CELARE
QUANTUM COMMUNICATIONS

WHAT'S NEXT

- Unfortunately no Quantera follup-up project (Denmark decided not to participate)
- Continuation of meetings every two weeks and joint project despite no joint funding



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Co-funded by
the European Union