

# Secure Communication with Quantum-Cryptographic Networks

(A. Poppe, M. Peev, T. Laenger)

Quantum Information Processing and Communication (QIPC) technologies are based on a completely new information science: Quantum Information. The new technologies emerging out of this field will potentially enable previously unfeasible tasks in computing and secure communication, and thus contribute to an improved quality of life.

**EUROPE** (Quantum Information Processing and Communication in Europe) is an FP6-FET Coordination Action program that aims at forming a unified, democratic and strong community in QIPC research in Europe, while embracing all the major QIPC tasks like the development of quantum cryptography, quantum teleportation, quantum computers, and a great variety of supporting techniques.

The FP6 Integrated Project **SECOQC** with 41 partners aims at developing long-range, networked Secure Communication based on Quantum Cryptography (Quantum Key Distribution – QKD). Basic research could already successfully be transformed into applied research with a focus on highly mature QKD-links, QKD-network design including network node modules and innovative networking protocols.

On October 8, 2008, during the SECOQC QKD-network conference in Vienna, the first live demonstration of a working network with eight QKD-links and six nodes has been presented to the scientific audience and the general public, demonstrating the high maturity and interoperability of quantum key distribution systems.

To show the impact on secure communication, existing business applications, like voice telephony and videoconferencing were secured by encryption and authentication algorithms employing key-material distributed over the SECOQC QKD-network. These results constitute basic building blocks necessary for bringing QKD networks to the market.

Although the SECOQC project sets an important milestone on the road to practical applications of QKD, intense further research is needed in order to unleash the full potential of QKD for solving essential security tasks as demanded by the information society of tomorrow.



City map of Vienna and the SECOQC network. The optical fiber ring connects the nodes, which host the network node modules and the QKD devices.



Development of a Global Network for Secure Communication based on Quantum Cryptography

<http://www.secoqc.net/>



## EUROPE

Coordinator: Prof. Eugene Polzik  
Niels Bohr Institute, Copenhagen  
University, Blegdamsvej 17,  
2100 Copenhagen – Tel.: +45 3532 5424,  
E-mail: [polzik@nbi.dk](mailto:polzik@nbi.dk)

<http://www.europe.net/>