THE CONSORTIUM

17 partners that bring multi-disciplinarity as a key to success!

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4

UNIVERSITÄT PADERBORN

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SMART

PHOTONICS

We University of

BRISTOL

- Quantum engineers with strong roots in theory & experiment
- RTOs turning basic science into applicable technology for years
- Photonic and electronic design of integrated circuits
- Design automation and simulation
- Assembly and Packaging
- Telecom system integration
- Industrial End-User perspective



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The second Quantum Revolution will only happen when it follows a success story such as microelectronics. UNIQORN's mission is therefore to provide the enabling photonic technology to accommodate quantum communications, by integrating complex systems, which are presently found on metre-size breadboards, into millimetre-size chips. These systems will not only reduce size and cost but will also bring improvements in terms of robustness and reproducibility. Such an endeavor essentially means

Revolutionizing the Quantum Ecosystem from Fabrication to Application

Starting with advanced components optimized for quantum applications UNIQORN will shoehorn entire quantum-optic systems into system-on-chip (SoC) realizations, leading to highly miniaturized solutions for further systemand network-level integration. Selected quantum applications beyond simple quantum key distribution will build on UNIQORN's highly integrated and yet cost-effective technology and will be evaluated in lab and field.

UNIQORN'S MISSION

reaches from quantum "fab" to quantum "app"



addresses 4 levels of quantum communication, covering the entire value chain

Components and gSoCs – quantum System-on-Chips

- Differential Phase Shift DV Transmitter
- Homo-/Heterodyne CV Receiver
- Quantum Random Number Generator
- Heralded and polarization / time-bin entangled photon pair sources
- 1550 nm up-conversion receiver
- Entangled squeezed light source

System Integration

- Low-Cost DPS QKD
- **Ouantum FPGA**
- Programmable EPR Node
- Quantum ROADM

Quantum Networking:

Programmable EPR

Quantum-aware SDN platform

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Network Integration

- Reconfigurable quantum overlay: the Quantum Whitebox

- Isolation through spatial multiplexing

Quantum Protocols and Applications

- One-Time Programs for cloud-based quantum processing
- Oblivious Transfer securing data base access
- QRNG as seed for NIC-integrated randomness engine
- Quantum-Secured IoT for Smart City and 5G