Eindhoven quantum key distribution

DUTCH ISRAELI QUANTUM TECHNOLOGY & 5G MINI-SYMPOSIUM

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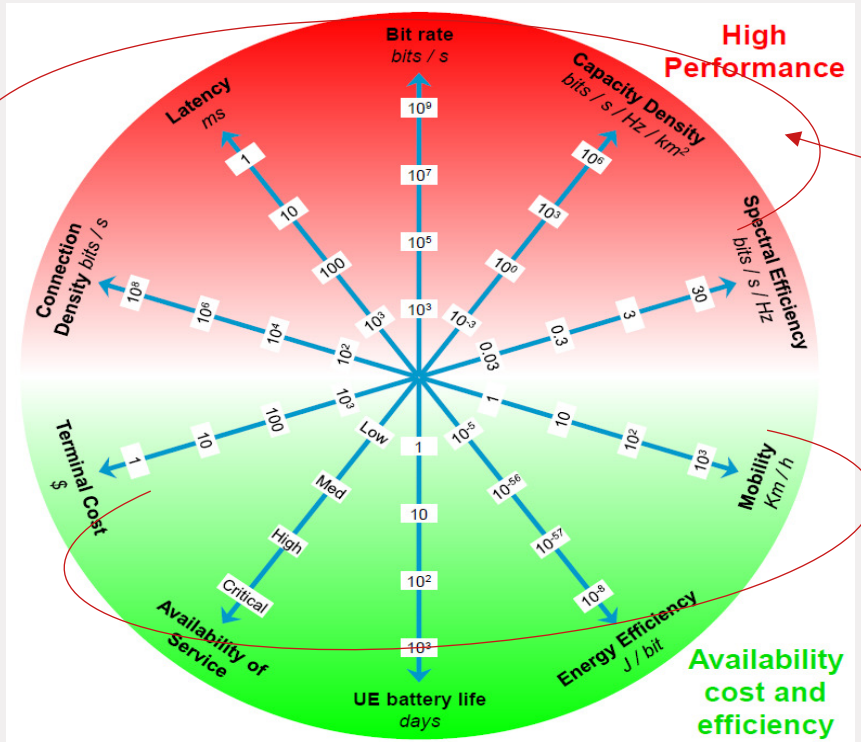
Department of Electrical Engineering – Terahertz Systems

TU/e Positioning in 5G research landscape

- Gbit/s peak data rates*
- Very high-capacity density*
- Very low latency*



* Keysight 5G positioning paper

Several 5G related projects at TU/e

5G PPP Bluespace

Coordinator: Tafur Monroy

Focus:
- Multicore fiber front/backhaul
- Wireless Ka-band wireless
- Latency/high capacity
- Optical beamsteering

ITN 5G STEP FWD

Focus:
- High capacity
- High density user-case
- WDM PONs
- Wireless E-band

5G PPP 5G PHOS

Focus:
- PICs for 5G
- Beamsteering
- High density mobile cells
- WDM PONs
- Wireless E-band

EUCAD CONCORDA

Focus:
- CACC for vehicle platooning
- GLOSA and RSU warning
- Hybrid LTE and ETSI ITS-G5
- Field Testing on real roads

5G PPP 5G MOBIX

Focus:
- Remote driving
- Cross border corridors
- mmw 5G systems
- Localization

ECSEL JU BRAINE

Focus:
- EDGE micro datacenter
- AI acceleration
- **Data privacy and security**
- IoT, 5G, Industry 4.0, smart healthcare and manufacturing

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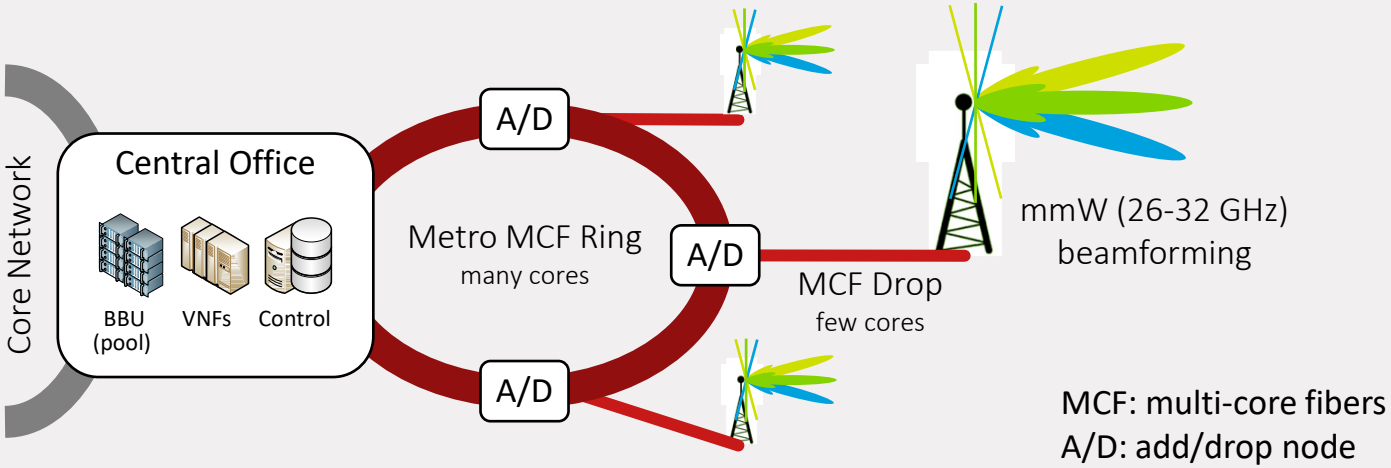
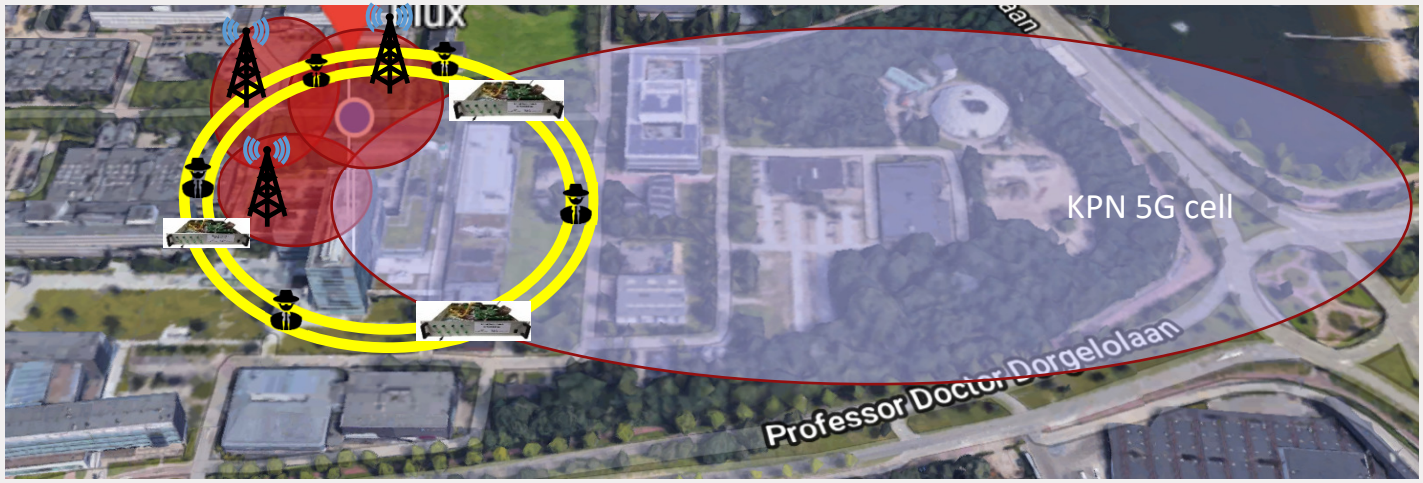
blueSPACE – In One Slide

- Ka-band wireless (26-32 GHz)
- Fully centralized RAN
- Space division multiplexing with MCF
- Shared ARoF and DRoF
- Converged RAN and PON
- SDN and NFV
- Optical beamforming for mm-wave ARoF
- Real-time BBU and IF unit



doi:10.5281/zenodo.1209373 – http://www.bluespace-5gppp.eu

Extending TU/e campus test site with quantum key distribution capabilities



Antenna Site

5G-MM cell

Quantum Encrypted Optical Fiber

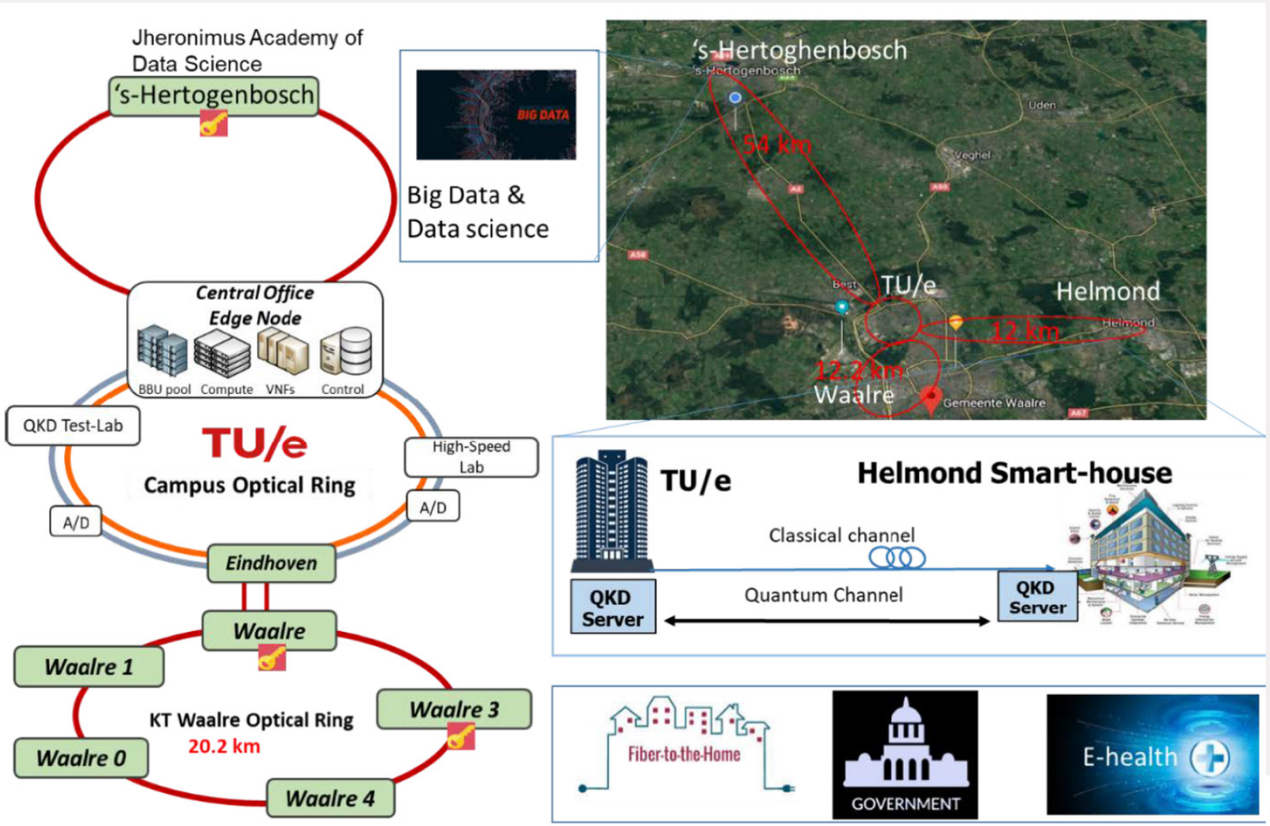
TUe Metro Access Node

Test-bed for validation for Quantum Key Distribution (QKD)

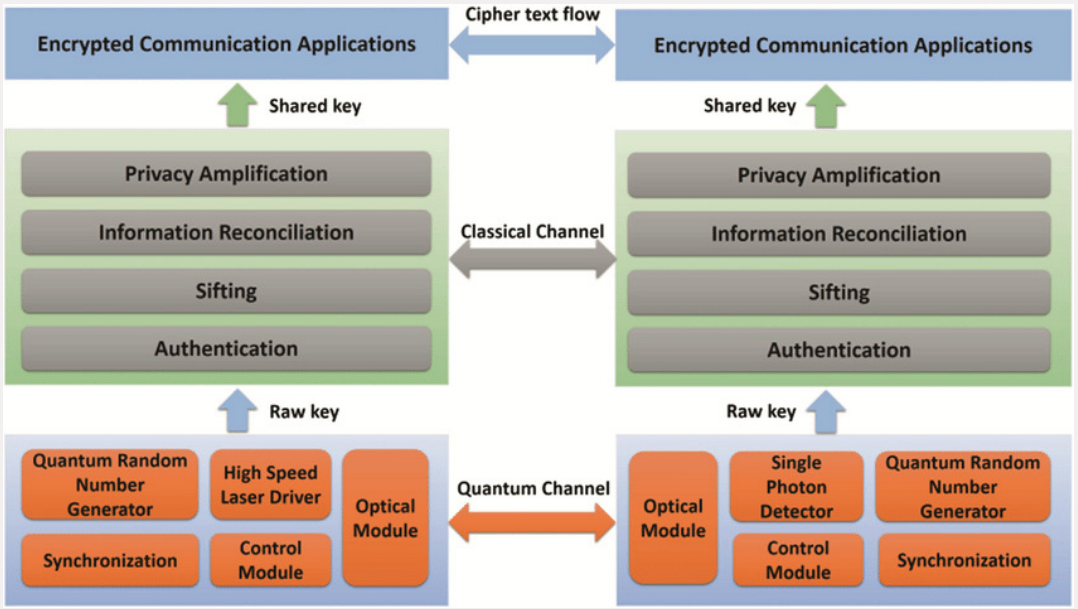
The Urgency:
In the event of quantum computer being deployed, all current classic cryptography methods are not safe nor is long term storage of data

Recently both Google and IBM claimed achieving earlier results on quantum supremacy

QKD provides a way to distribute and share secret keys required for cryptography



Complete Test, validation and certification for QKD as a service



Validation and certification

trust and access

End-to-end security proof

Test, validation, **interfaces**

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Looking for partnerships for:

Developing a pilot for QKD for smart living and 5G autonomous driving

Expertise in:

- Classic and post-quantum cryptography
- Use case validation in smart living
- 5G platform for autonomous driving

Activities

- Development of Security Proofs
- Transmission distances extension
- Increasing Key rates
- Development and testing of Photonic Integrated transceivers
- Verification of QKD protocols
- Certification
- Pre-commercialization

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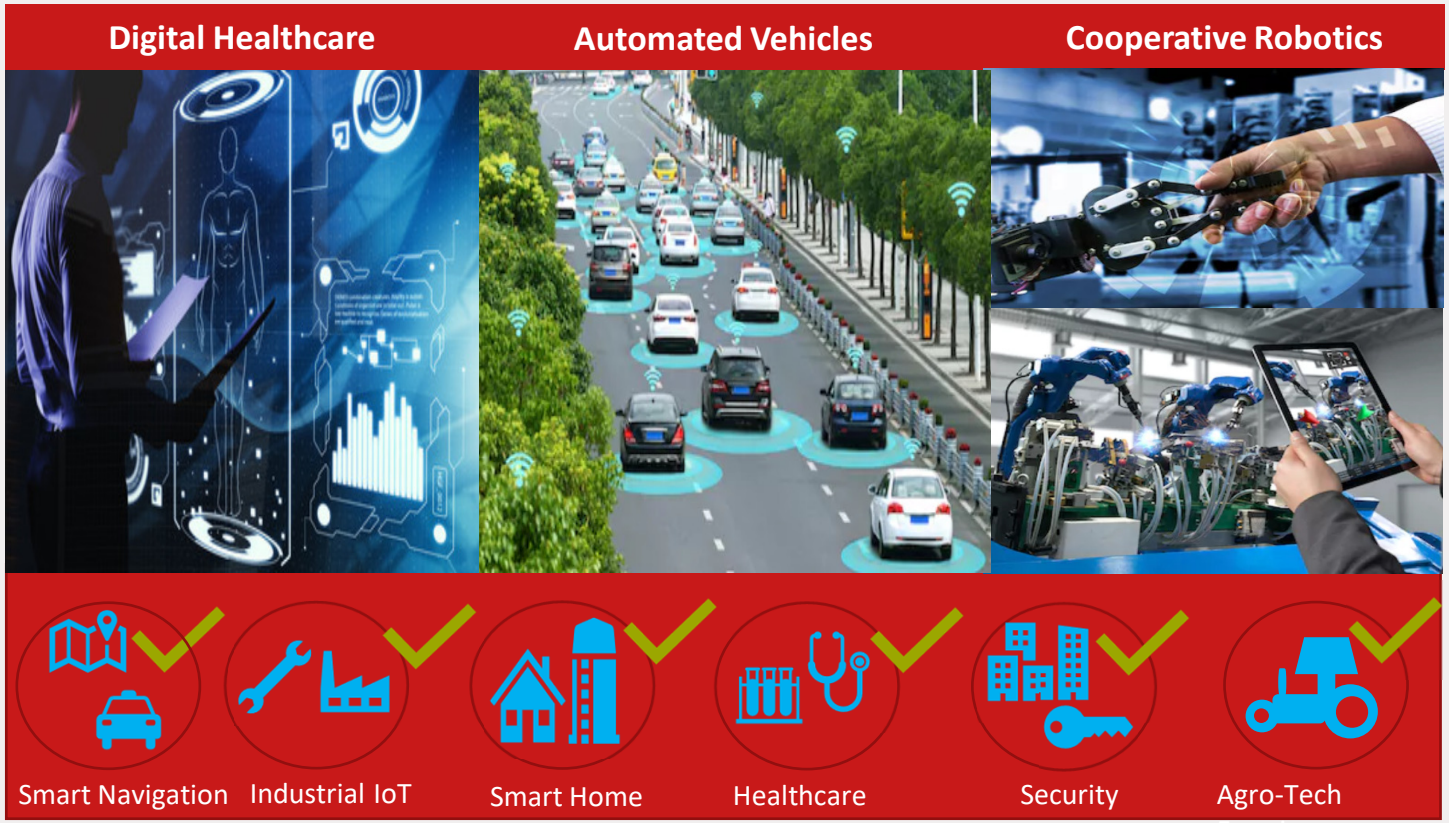
Next…adopting QKD to Multiple Business and Use Cases



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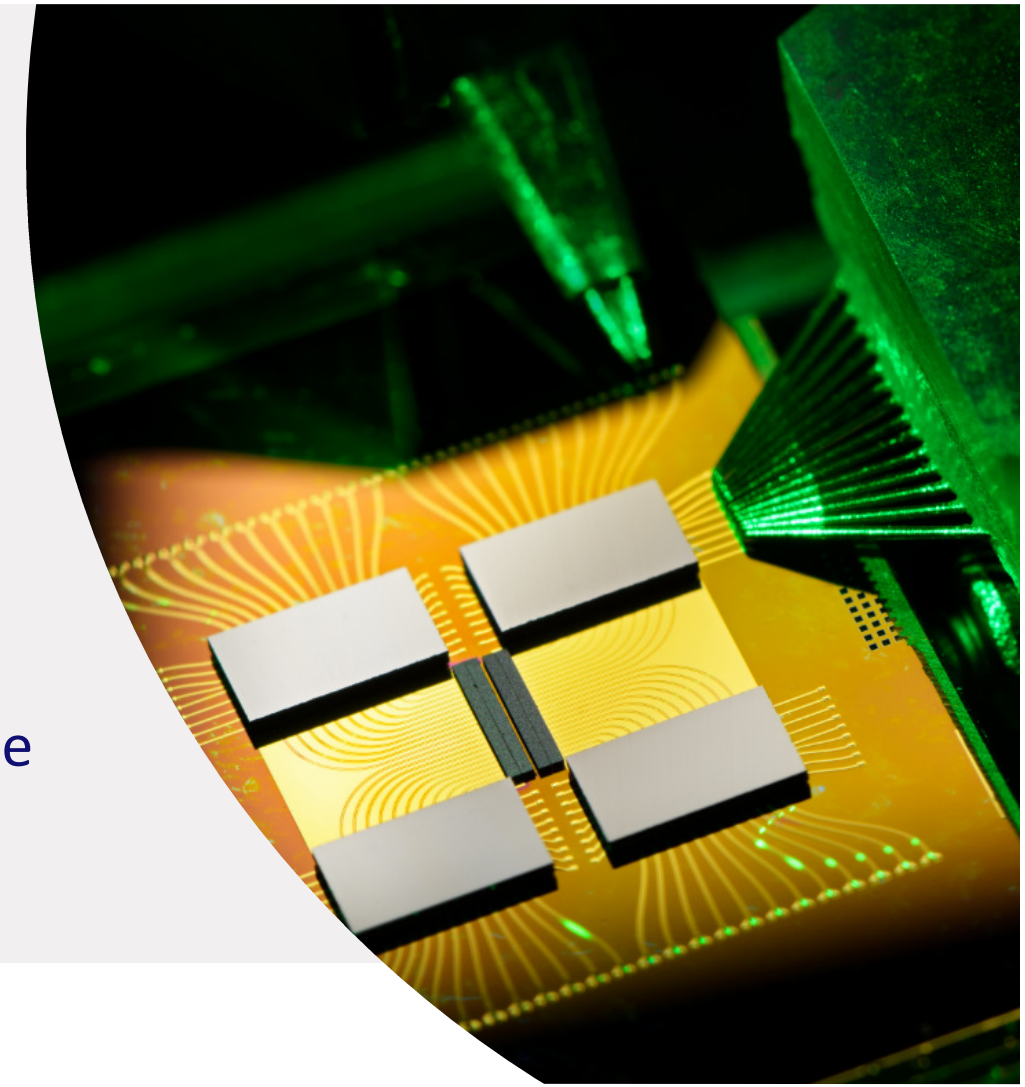
Further –QKD Systems on Photonic Chips

Design, fabrication and test of Quantum systems on chip

Leveraging on TU/e PIC expertise



Conclusion

- ❑ Creating the infrastructure and expertise for one-stop test and validation of quantum cryptography

Look for partnerships

- ❑ Classic and post-quantum cryptography
- ❑ Use case validation:
  - Smart house, healthcare, industry
  - 5G services
  - Autonomous driving
- ❑ Accelerate market penetration
- ❑ Quantum systems on chip

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Contact

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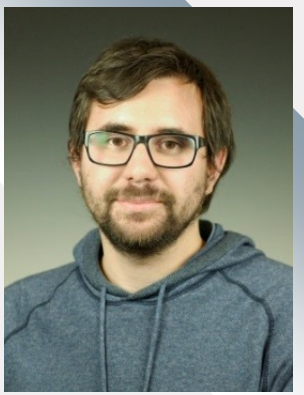

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