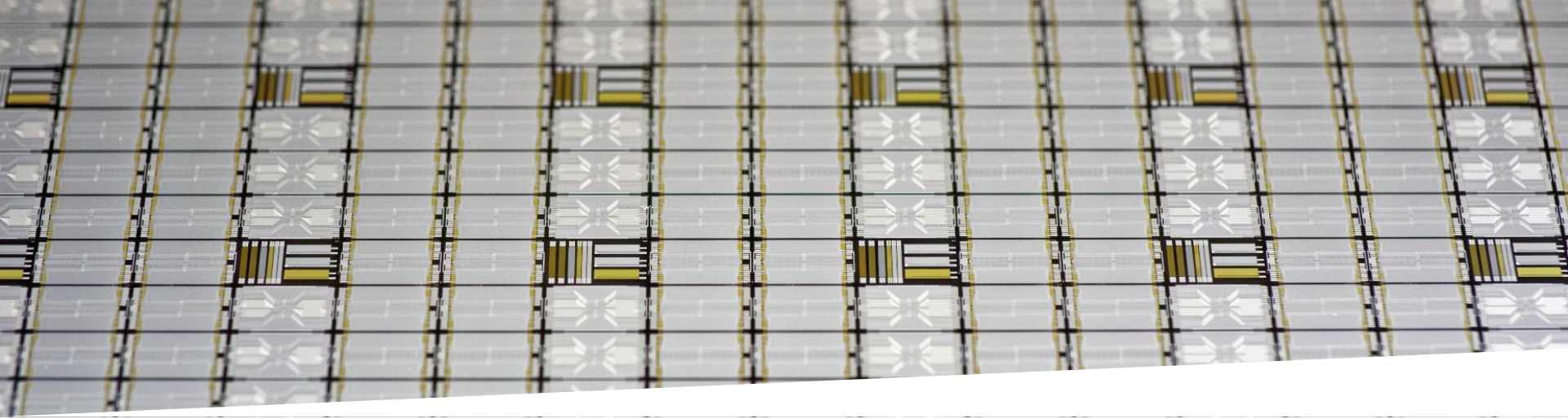


EPIC Online Quantum Technology Meeting on Moving to Next-Generation Transport and eMobility

Clemens Rössler, Silke Auchter, Benjamin Bernard

2021-03-21

Infineon is a globally leading semiconductor player

* over the cycle 9%+ revenue growth; 19% Segment Result margin; investment-to-sales ratio of 13%;
targets to be approached as integration progresses

top 10
semiconductor company

~46,700
total employees

~7,800
R&D employees

leading player
in automotive, systems for power management and drives, sensor systems, connected secure systems, wireless combos, differentiated memories

9%+ I 19% I 13%
target operating model*

Business growth in the semiconductor market is driven by four areas

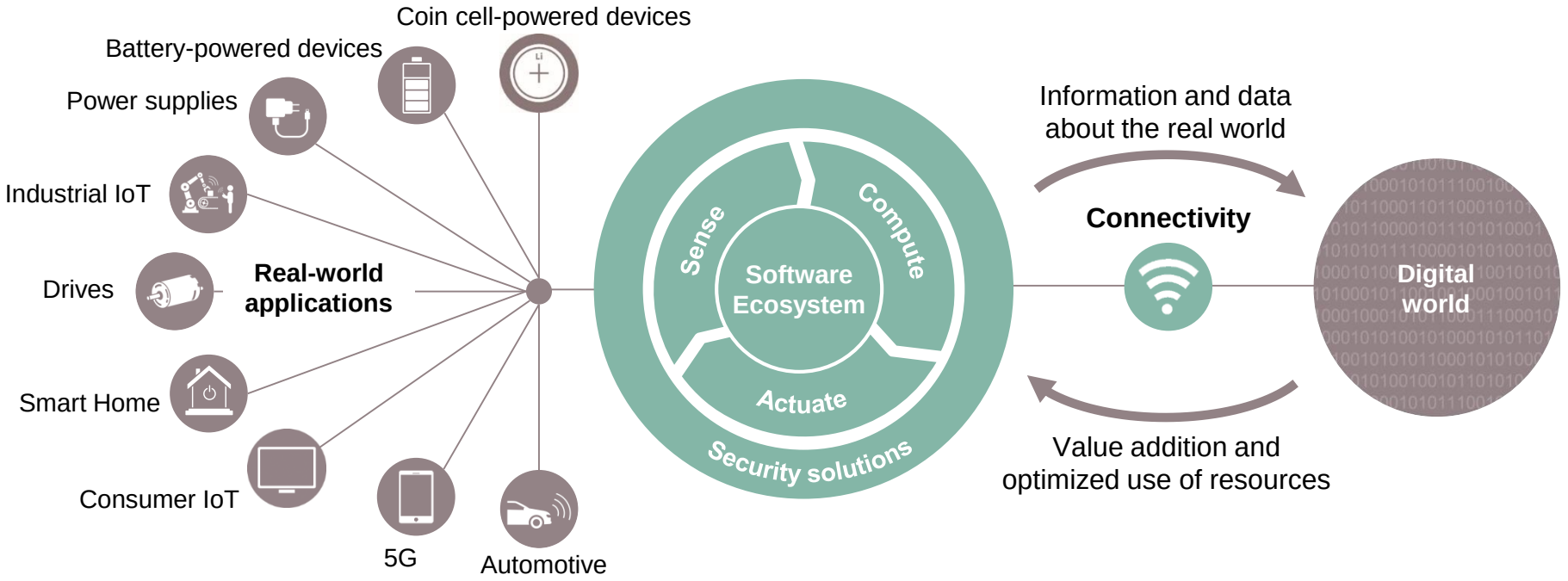
Energy efficiency

Mobility

Security

IoT and big data

Infineon offers a unique portfolio that links the real and the digital world



Sense: sensors Compute: microcontrollers, memories Actuate: power semiconductors Connectivity: Wi-Fi, Bluetooth, USB

Mobility

Growth drivers and major product categories

- **Electro-mobility**: IGBT modules, SiC modules, discrete power devices, MCUs, sensors
- **Charging infrastructure for electro mobility:** IGBT modules, SiC modules, SiC discretes, discrete power devices, MCUs, security solutions
- **Automated driving:** Sensors, radar, MCUs, power devices, memories, connectivity and security solutions
- **Passenger and freight transport:** High-power IGBT modules
- **Infotainment**: MCUs, touch control, Wi-Fi/BT controllers, USB Type-C PD controllers

Why do we need Quantum Computing?

Demographic & social change

- Health: new pharmaceuticals
- Diagnostics

Climate change & scarce resources

- Food: fertilizer production
- Energy: room temp. superconductivity

Optimizations

- Logistics: Scheduling, Routing, Planning
- All material science topics, chemistry
- Pharmaceutical, Diagnostics, Vaccines

Source: BCG-The-Next-Decade-in-Quantum-Computing, Nov. 2018

- Traffic & Parking routing
- Autonomous traffic

Urbanization

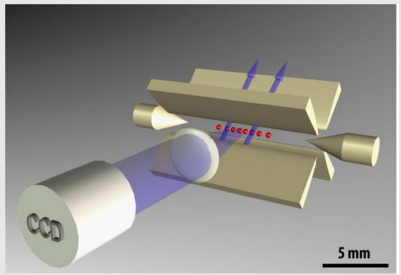
- Big data: database search (Grover algorithm)
- Security: prime factorization (Shor algorithm)

Digital transformation

Trapped-Ion Quantum Computing

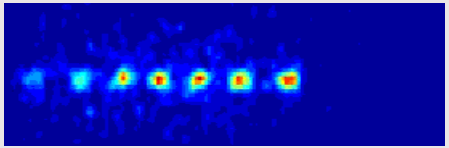
Trapping Ions

- Quadrupole potential confines the ion in the center in two dimensions
- In the third dimension the ion is confined by DC endcap electrodes



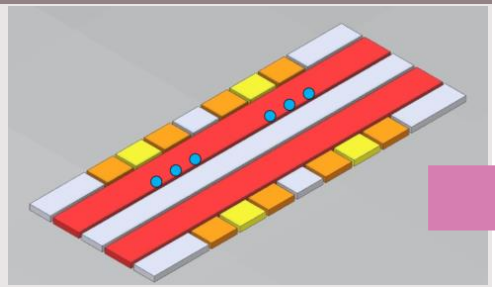
Entanglement in an ion trap

- Coupling of the ions through motional modes of the quantum bus
- Entanglement by coupling the ions´ internal states to the motion of the quantum bus



Linear surface trap

- Control of single ions possible
- Smaller functional blocks for better coupling
- But: number of ions to be entangled is still limited!

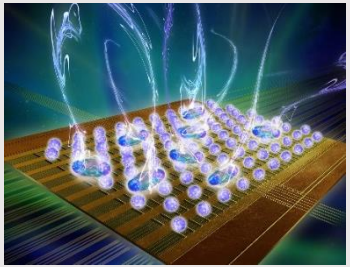


QC Vision

This project has received funding from the European Union's Horizon 2020 research and innovation programme under agreement No. 801285.

- Ions form a huge array of connected qubits
  → 2nd dimension
- Complex architectures require highly reliable microfabrication
  → Industrial fabrication

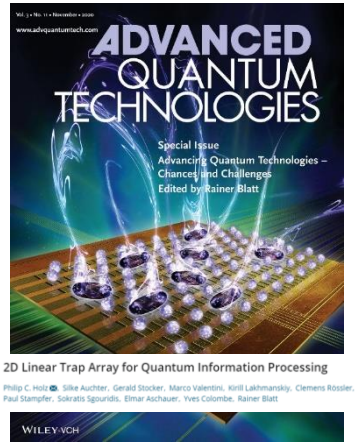
PIEDMONS



The Infineon Q –Kontinuum

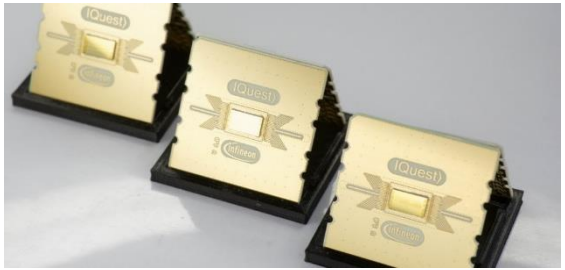
Michael Sieberer

„Q“ Himself



What we can do for you

- Being part of a strong team
- Working on innovative state of the art quantum technologies
- Master thesis:
  - Metal Stack Technology Development for Trapped-Ion Quantum Processors
  - Integrated Optics Feasibility Study of Trapped-Ion Quantum Processors



What you can do for us

- Integrated Optics (waveguids, mirros, etc)
- Integrated Photonics (Diodes etc)

Part of your life. Part of tomorrow.