QUANTUM TECHNOLOGY AND APPLICATION CONSORTIUM

QUTAC

Introduction to QUTAC

15. Security Forum Quanten, Qubits und Security

19.1.23 Technische Hochschule Brandenburg

Brandenburg an der Havel

Dr. Stefan Saatmann – Siemens AG

On the road to industrial application

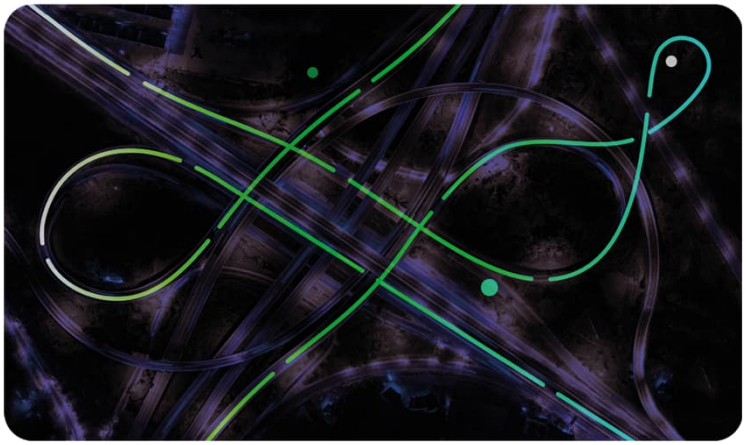
QUTAC was founded to contribute to the technological sovereignty of Germany and Europe through an early industrial entry into the field of quantum computing.

Quantum computers have the **potential to help solve many industrial** challenges and most probably will influence many sectors of our economy.

However, the industrialization of quantum computing not only requires the technology, but a market as well.

Germany and Europe have **top-level research**, and **strong industries** that offer promising fields of application for quantum computing. Thus, an important next step will be to combine the two and **create an ecosystem** that utilizes German and European strengths.

It is crucial for the German industry to **take an active role** in this emerging ecosystem, to **establish sustainable partnerships**, and to **complement existing initiatives** (e.g., QuIC) in a meaningful way.



Copyright © QUTAC 2023. All rights reserved.

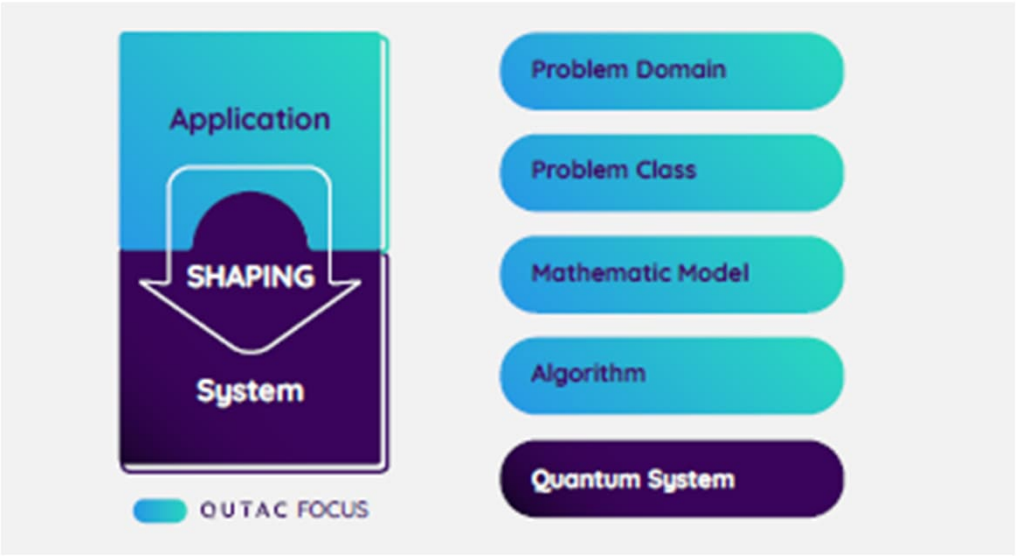
Way of working

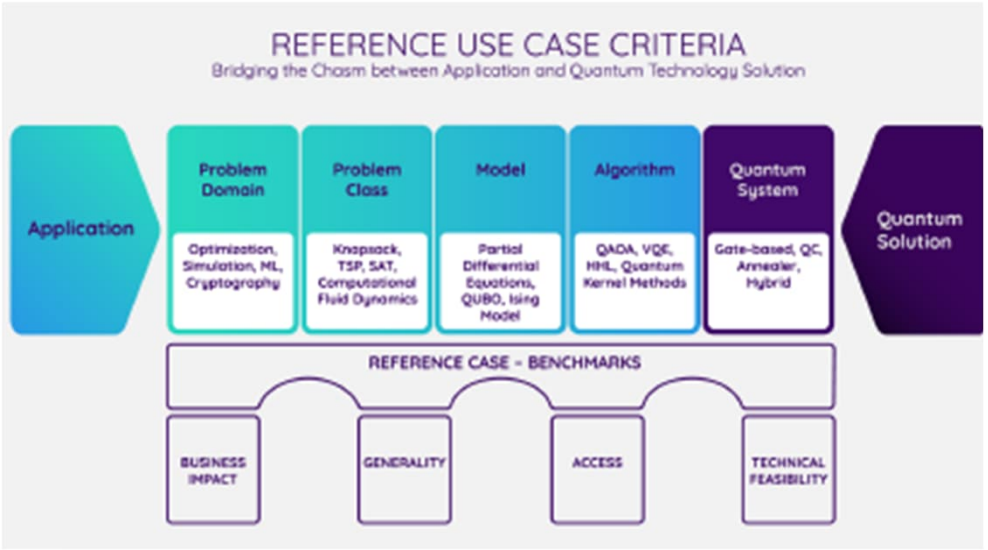
With a focused approach QUTAC aims to bring quantum computing to the level of practical application and actively shape a new digital future

- QUTAC brings together **ten of Germany's leading corporations.**
- As a **driving force** behind the **industrialization** of quantum computing in Germany, we want to **identify, develop, test and share potential applications.**
- We see ourselves as a platform for action; **economic and industrial success count.**
- We will complement and actively **cooperate with the QC ecosystem.**
- We need to **focus** and keep our aspiration in mind to stay **fast and agile.**

Copyright © QUTAC 2023. All rights reserved.

QUTAC Focus





Copyright © QUTAC 2023. All rights reserved.

Action required.

SIEMENS	QaRL – Quantum Assisted Reinforcement Learning – Applicable to many Industrial Use Cases		
Industry	Cross Industry	Function	Data Analytics
Problem Domain	Machine Learning	User	Data Scientists
Business Challenge	Improved real-time decision making.		
Value Proposition	Data analytics speed-up.		
QC Solution Approach:	Reinforcement learning algorithms are augmented by quantum primitives (projective simulation, quantum random walks or using parametrized VQC as value function approximators).		
Problem Class	Tbd (Quadratic program)	Model	QUBO
Algorithm	VQE, QAOA	Hardware	Dwave, IBM
QC limitations:	Restricted number of qubits. Limited on-chip connectivity. Limited quantum volume.		
Time to Maturity	◑	Potential Impact	◑

Copyright © QUTAC 2023. All rights reserved.

QUTAC at a glance

QUTAC

Application-focused Industrial activity platform

QUTAC aims to carry quantum computing towards broad industrial application and to actively shape a new digital future.

Clear mission, clear goals

QUTAC want to

- Build an economically successful German quantum computing ecosystem.
- Identify, develop, test and share applications
- Highlight opportunities for funding

Broad spectrum of applications

QUTAC's work concerns applications in the areas of

- Optimization
- Simulation
- Machine Learning
- Cryptography

Concentrated German industrial competence

QUTAC's members are the companies BASF, BMW, Boehringer Ingelheim, Infineon, Merck, Munich Re, SAP, Siemens, Volkswagen and Bosch.

QUANTUM TECHNOLOGY AND
APPLICATION CONSORTIUM