



14th April 2022

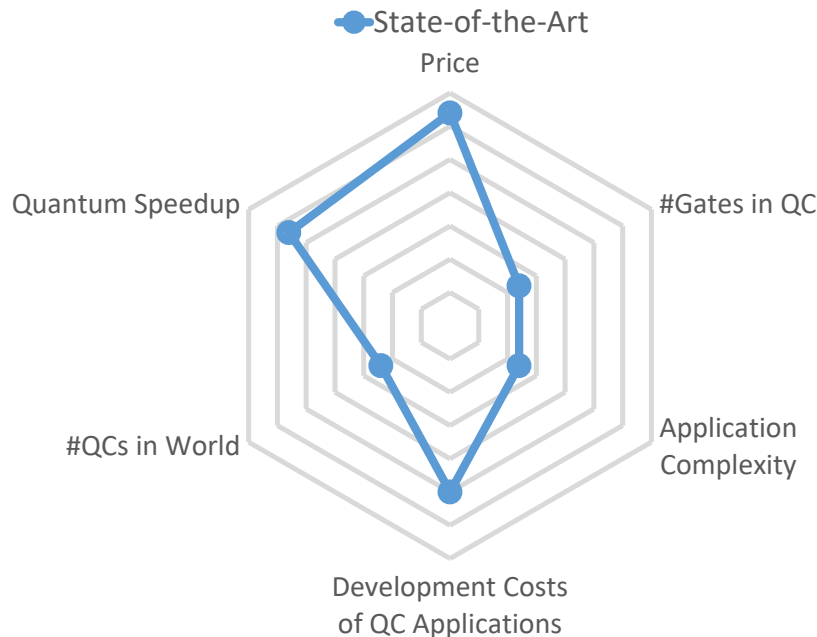
# World Quantum Day 2022

## Panel: Quantum Computing - Hardware, Methods and Algorithms

Professor Dr. rer. nat. habil. Sven Groppe

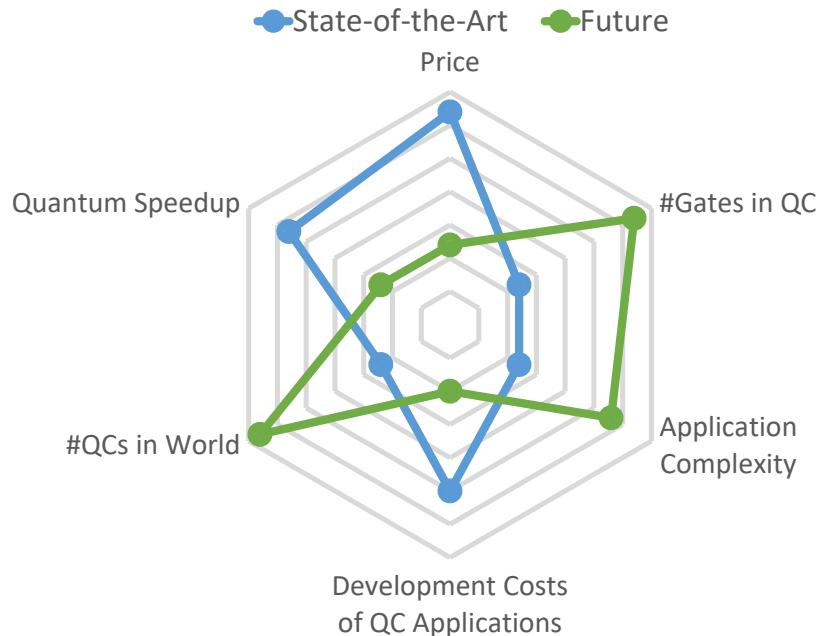
<https://www.ifis.uni-luebeck.de/index.php?id=groppe>

# Properties of State-of-the-Art Quantum Computers



- State-of-the-Art
  - Quantum Computer as Cloud Resource
  - Only few world-wide
  - Race for Quantum Supremacy "10,000 years (classical) in 200 seconds (quantum)"
  - Price affordable only for large organizations

# Properties of Future Quantum Computers



- Future Quantum Computers
  - Price low: affordable for medium-sized companies
  - installed in many companies
  - Quantum Speedup for many applications, small speedups already interesting
  - High-level quantum programming languages, quantum applications easy to develop
  - All students in physics and computer science learn development of quantum applications

# Activities

## QC Tools and Programming Languages for simple QC Application Development

High-Level Programming Language → Quantum Circuit  
Library/API Development

## QC Applications

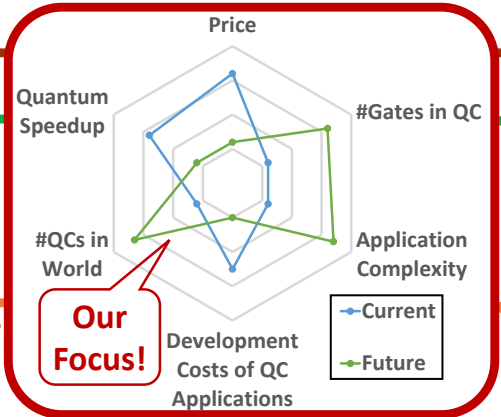
Machine Learning  
Semantic Web data management  
Health Informatics

### ... QC4DB

Accelerating Relational Database Management Systems via Quantum Computing



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**We are hiring:  
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## Teaching

- Lecture + Seminar "Quantum Computing"
- Master Computer Science
- Advanced Study Program in AI
- Lecture + Tutorial "Quantum Image Computing"
- Bachelor/Master Computational Life Science



## Possible Collaborations

- Joint research
  - In progress: VIT Chennai/India
- Project acquisition
- Organization of scientific events
  - Workshops & conferences
- Special issues in journals
- Book editorships
- ...

Please contact  
Prof. Dr. Sven Groppe  
[groppe@ifis.uni-luebeck.de](mailto:groppe@ifis.uni-luebeck.de)