

# Quantum Technologies at DESY and in Partner Institutes

What are the present activities ?

What are the prospects ?

Where are opportunities for collaboration ?

DESY Quantum Technology Task Force  
DESY, September 2020

[qt-task-force@desy.de](mailto:qt-task-force@desy.de)



# Quantum Technologies at DESY and on Campus

## Introduction

### **Quantum Technologies are the Future**

QT will change the way how we do our science and maximize the success in our research topics. QT has an immense growth potential - upcoming Helmholtz and other funding opportunities from the government will be available for DESY and common projects with partners on campus

### **DESY and the associated institutes have excellent competences in QT:**

complementary activities presently concentrating in Particle and Astroparticle Physics and in Photon Science, all divisions and research areas on campus can greatly benefit, eg. computing for complex simulations, optimization challenges.

### **DESY and institutes on campus have unique facilities**

→ unique profile to drive evolution of QT and to play a leading role on the various levels.

### **Presently three initial pillars for QT topics at DESY**

- **Development of quantum computing algorithms for applications**
- **Materials and photonics research and development towards a useful quantum computer**
- **Quantum sensors as evolving/enabling and also applied technology**

# The DESY Quantum Technology Task Force

## Mandate and Imminent Steps

**Mandate:** Evaluate the various topics of Quantum Technologies for DESY

- Assess and evaluate the opportunities for Quantum Technologies at DESY
- Identify running or planned QT activities on the whole DESY campus (Hamburg, Zeuthen, partner institutes and universities)
- Assess the importance of QT for all divisions at DESY, (PETRA IV, Particle Physics and beyond...)
- Develop a vision for QT activities at DESY and in cooperation with institutes on campus

## Imminent Steps

- collect feedback and identify interested colleagues by discussing QT in division
- organize a campus-wide workshop (21 / 22 Sep 2020)
- assess abilities, ambitions and opportunities

# The DESY QT Taskforce

## Members

**Present Members** ( reachable via email [qt-task-force@desy.de](mailto:qt-task-force@desy.de) )

- Martin Beye, Kerstin Borrás, Volker Gülzow, Cigdem Issever, Karl Jansen, Dirk Krücker, Kai Rossnagel, Robin Santra, Hubert Simma, Steven Worm, Klaus Ehret (ex officio)



# Workshop Schedule

Quantum Technologies are the Future.

## Monday, 21 September 2020

- |               |   |
|---------------|---|
| 14:00 - 14:05 | Welcome 5'<br>Speaker: Kerstin Borras (DESY)  |
| 14:05 - 14:25 | Quantum Computing Applications 20'<br>Speaker: Dr. Karl Jansen (NIC, DESY)  |
| 14:29 - 14:30 | QT Activities in the Berlin Area (cancelled) 1'<br>Speaker: Prof. Jean-Pierre Seifert (TU Berlin)   |
| 14:30 - 14:55 | X Rays and Quantum Technologies 25'<br>Speaker: Prof. Robin Santra (DESY & UHH)   |
| 15:00 - 15:20 | Condensed Matter Concepts of Quantum Technologies 20'<br>Speaker: Prof. Michael Thorwart (Universität Hamburg, I. Institut für Theoretische Physik) |
| 15:25 - 15:45 | Quantum Sensor Activities at DESY 20'<br>Speaker: Dr. Steven Worm (DESY)  |
| 15:50 - 16:00 | Plenary Discussion 10'  |
| 16:15 - 17:00 | Discussion Round<br><i>Please contact <a href="mailto:qt-task-force@desy.de">qt-task-force@desy.de</a> for participation</i>                        |

## Tuesday, 22 September 2020

- |               |  |
|---------------|--|
| 14:00 - 14:20 | Quantum Technologies Based on Atoms 20'<br>Speaker: Prof. Klaus Sengstock (ZOQ, UHH)   |
| 14:25 - 14:45 | Sensing, metrology and QKD with quantum-correlated continuous-wave light 20'<br>Speaker: Prof. Roman Schnabel (ZOQ, UHH)                 |
| 14:50 - 15:10 | Self-assembled Droplet Etching for versatile Quantum Structures 20'<br>Speakers: Prof. Wolfgang Hansen (CHyN, UHH), Christian Heyn (UHH) |
| 15:15 - 15:40 | Quantum Computing Applications at CERN Openlab (S. Vallecorsa) 25'   |
| 15:45 - 16:00 | Plenary Discussion 15'   |
| 16:15 - 17:00 | Discussion Round<br><i>Please contact <a href="mailto:qt-task-force@desy.de">qt-task-force@desy.de</a> for participation</i>             |

# Thank you

DESY QT Task Force reachable via [qt-task-force@desy.de](mailto:qt-task-force@desy.de)

**Interested ?**

**Sign-up in this community email list**

[quantum-technologies@desy.de](mailto:quantum-technologies@desy.de)