

THU 11: Quantum Technology and Industry

Time: Thursday 14:15–15:45

Location: ZHG104

THU 11.1 Thu 14:15 ZHG104

Quantum Valley Lower Saxony - An ecosystem for quantum technologies — ●LENA BITTERMANN — Physikalisch-Technische Bundesanstalt, Braunschweig, Germany

Quantum Valley Lower Saxony (QVLS) is a growing ecosystem for quantum technologies based in Braunschweig and Hanover. QVLS connects research institutions, startups, and industry partners to drive innovation and accelerate the development of enabling technologies.

In our Cluster4future QVLS-iLabs we promote technology transfer through close cooperation between science and industry. With strong regional infrastructure, collaborative projects, and strategic partnerships, QVLS supports the path from fundamental research to real-world applications in the emerging quantum economy.

THU 11.2 Thu 14:30 ZHG104

Patentierung von Quantentechnologie — ●MATTHIAS GROB — Pavant Patentanwälte PartGmbH, Hamburg, Germany

Im Bereich der Quantentechnologie, insbesondere des Quantencomputings und der Quantensimulation, werden in zunehmender Zahl Patente angemeldet. Der Beitrag gibt Einblicke in das Patentwesen mit starkem Bezug zur Quantentechnologie und illustriert dabei auch die Motivation für Patentanmelder:innen und -inhaber:innen. Zudem geht der Beitrag auf die Patentierbarkeit von Quantentechnologie ein.

THU 11.3 Thu 14:45 ZHG104

Ultra Broadband Lens for Quantum Computing Applications — ●THOMAS FRICKE-BEGEMANN¹, GREGOR MATZ¹, CHRISTOPH CHARTON¹, THOMAS THOENISS¹, ASTRID BINGEL², and FRIEDRICH RICKELT² — ¹Excelitas Technologies, Göttingen, Germany — ²Fraunhofer IOF, Jena, Germany

Quantum computing platforms using trapped ions or neutral atoms require optical control of an array of single qubits for a wide range of functionality including e.g. MOTs, optical tweezers, laser cooling, single and two qubit gates and detection. Ideally, the optical access involving multiple laser beam arrays over a large spectral bandwidth can be provided via a single optical system.

Here, we report on the development of an objective lens that allows the control of Rydberg atom qubits over a wavelength range from approximately 310 to 820 nm, thus enabling the use of a multitude of atomic transitions. It provides an ultra-long working distance and is designed to operate through the window of a UHV glass cell. The high NA allows addressing single qubits within a large field. To ensure high transparency over the large spectral bandwidth and to meet polarization preserving requirements, special AR-coatings including nanostructured layers with very low effective refractive index are used inside the lens.

THU 11.4 Thu 15:00 ZHG104

Streamlining Quantum Measurements: Simplifying Complexity — ●AVISHEK CHOWDHURY — Zurich Instruments GmbH

Quantum sensing and metrology applications frequently depend on transferring quantum information between different physical systems across a wide range of frequencies. This process is often linked with the need for continuous or pulsed measurements and sophisticated feedback mechanisms. In this talk I connect the insights from my own research on optomechanics and quantum sensing with how the current product offerings from Zurich Instruments are facilitating a more streamlined approach for efficient implementations.

THU 11.5 Thu 15:15 ZHG104

Advanced Quantum Technologies - expert peer review and quality quantum science publishing in QUTE — ●STEFAN HILDEBRANDT, CHRISTIANA VARNAVA, and HUAN WANG — Advanced Quantum Technologies, Wiley-VCH GmbH, Berlin, Germany

Since 2018, Wiley-VCH with Editorial Offices in Berlin and Beijing has been publishing Advanced Quantum Technologies (QUTE, <http://www.advquantumtech.com>), which is now one of the leading peer-reviewed quantum journals, ranked Q1/Q2 in quantum science, technology and optics. The editors provide a first-class editorial service, offering expert peer review and rapid publication (with a typical turnaround time of <10 days for the first editorial decision, about 90 days to acceptance, and 19 days from acceptance to online publication). Core areas will be presented that cover a broad spectrum of regular papers, including Reviews, Perspectives and Research Articles, with highlights and special issues focusing on quantum networks, quantum communication and key distribution, quantum photonics, quantum materials and many other topics, ranging from theory to experimental applications. We will describe submission requirements, the editorial process and the role of artificial intelligence in today's science publishing, as well as opportunities for open access publication with CC-BY licenses under the Wiley-DEAL agreement and other transformational agreements worldwide.

THU 11.6 Thu 15:30 ZHG104

From Bits to Qubits: d-fine's Role in Pioneering Quantum Technology Innovations — ●SABINE MATYSIK, DANIEL OHL DE MELLO, and DANIEL HERR — d-fine GmbH

d-fine is a European consulting firm specialised in analytical, quantitative and technological challenges. Since 2018, we have been continuously expanding our team in the field of quantum technologies and quantum computing, and are conducting an increasing number of projects in collaboration with research institutes and industry partners.

During the presentation, we will provide an overview of our approach to projects and initiatives to date. These include projects on the development of algorithms for use cases in climate modelling, material science and mobility, as well as software development for managing access to quantum hardware, analysing security aspects of quantum machine learning, and the development of efficient hardware decoders for quantum error correction.