FREIE UNIVERSITÄT BERLIN

Office of Communication and Marketing

Exploring the Potential of Quantum Digital Transformation

Launch of the first Einstein Research Unit of the Berlin University Alliance on the topic of quantum computing

№ 080/2021 from May 06, 2021

Joint press release by Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin along with Charité – Universitätsmedizin Berlin

How can quantum computers revolutionize the computational power of computers? What new insights do quantum computers offer for high energy physics or quantum chemistry? These are the questions that the first Einstein Research Unit (ERU) of the Berlin University Alliance (BUA) will address. The interdisciplinary research team of the partner institutions Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin, and Charité – Universitätsmedizin Berlin has set itself the task of clarifying the potential of the quantum digital transformation. This uniquely brings together expertise in theoretical and experimental physics, applied mathematics, computer science, and machine learning. The Einstein Research Unit "Perspectives of a quantum digital transformation: Near-term quantum computational devices and quantum processors" will be funded with two million euros annually for an initial three years.

"The funding decision for this first Einstein Research Unit is a milestone for the interdisciplinary research landscape in Berlin," says Prof. Dr.-Ing. Dr. Sabine Kunst, president of Humboldt-Universität zu Berlin and spokesperson for the BUA. "In this way, the Berlin University Alliance supports excellent research in the long term in an area that is highly relevant to our society today and in the future."

Quantum computers are considered one of the key technologies of the 21st century. With them, scientists hope to solve computational problems that cannot be solved nowadays, even with supercomputers. The continued development of quantum computers also holds great potential for the economy. Only the technological progress of recent years has made it possible to build the first prototypes of such quantum computers. Unlike classical computers, they handle information based on quantum mechanical laws. This means that memory contents on these computers can, at the same time, contain multiple, superimposed values, on which computing instructions have a simultaneous effect.

The research team led by Prof. Dr. Jens Eisert, physicist and mathematician at Freie Universität Berlin, Prof. Dr. Oliver Benson, physicist at Humboldt-Universität zu Berlin, Prof. Dr. Jean-Pierre Seifert, Einstein professor and computer scientist at Technische Universität Berlin, and Prof. Dr. Robert Gütig, member of the NeuroCure Cluster of Excellence at Charité – Universitätsmedizin Berlin, explores quantum computing from an interdisciplinary perspective.

"We are pleased that the first Einstein Research Unit can now be launched after the successful international scientific review by the Einstein Foundation," says Prof. Dr. Günter Stock, Chair of the Executive Board of the Einstein Foundation Berlin, about the funding decision of the Berlin University Alliance. Einstein Research Units are intended to establish long-term research alliances in strategically important research fields of the Berlin University Alliance. They will strengthen strategically relevant, interdisciplinary research areas and develop new inter- and transdisciplinary research objectives.

The Berlin University Alliance

The Berlin University Alliance is a consortium consisting of three major Berlin universities – Freie Universität Berlin, Humboldt-Universität zu Berlin, Technische Universität Berlin – and Charité – Universitätsmedizin Berlin, established to shape research and education in Berlin. The four partners joined forces to further develop Berlin as a research hub with international drawing power. Together the partners explore major societal challenges, increase public outreach, promote the training of junior researchers, address issues of quality and standards in research, and share resources in the areas of research infrastructure, teaching, diversity, equal opportunities, and internationalization. The Berlin University Alliance is funded by the Federal Ministry of Education and Research (BMBF) and the state of Berlin under the Excellence Strategy of the Federal Government and the Länder.

The Einstein Foundation Berlin

The Einstein Foundation Berlin is an independent, not-for-profit, science-led organization established as a foundation under civil law in 2009. Since then, its task has been to promote international cutting-edge science and research across disciplines and institutions in and for Berlin. To date, it has funded 172 researchers, including three Nobel laureates, 71 projects, and six Einstein Centers

Joint press release issued by Freie Universität Berlin, Humboldt-Universität zu Berlin, Technischen Universität Berlin, and Charité – Universitätsmedizin Berlin

Press Contact

- Hans-Christoph Keller, acting press spokesperson for the Berlin University Alliance and press spokesperson for the Humboldt-Universität zu Berlin, Email: medien@berlin-university-alliance.de
- Christian T. Martin, head of communications, Einstein Foundation Berlin, Email: cm@einsteinfoundation.de, Tel.: +49 30 20370 248
- Research contact: Prof. Dr. Jens Eisert, Dahlem Center for Complex Quantum Systems, Freie Universität Berlin, Email: jense@physik.fu-berlin.de

KEYWORDS

Cooperation | Physics | Research