

Pressemitteilung

Rheinische Friedrich-Wilhelms-Universität Bonn

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24.11.2023

<http://idw-online.de/de/news824778>

Forschungsprojekte, Kooperationen
Chemie, Physik / Astronomie
überregional



New Collaborative Research Center quantum systems at the University of Bonn

The new Collaborative Research Center (CRC) "NuMerIQS: Numerical Methods for Dynamics and Structure Formation in Quantum Systems" aims to advance the understanding of dynamics and structure formation in quantum systems. The German Research Foundation (DFG) is setting up the CRC at the University of Bonn to strengthen cutting-edge research. Forschungszentrum Jülich and the Max Planck Institute für Kohlenforschung are also involved. The start is planned for April 2024. Over the next three years and nine months, around eight million euros will flow into the research network. The Transdisciplinary Research Area "Matter" at the University of Bonn supported the creation of the CRC.

The Collaborative Research Center "NuMerIQS: Numerical Methods for Dynamics and Structure Formation in Quantum Systems" links numerical methods developed in physics and chemistry with each other and these in turn with the latest developments in mathematics and computer science. "We want to tackle previously unsolvable problems in chemistry and physics together," says Prof. Dr. Carsten Urbach, spokesperson for the new Collaborative Research Centre. "The interdisciplinary collaboration between physics, chemistry, numerical mathematics and computer science is outstanding," says the physicist from the Helmholtz-Institute for Radiation and Nuclear Physics and the Transdisciplinary Research Areas "Matter" and "Sustainable Futures" at the University of Bonn. Other researchers from the Transdisciplinary Research Area "Modelling" will also be involved.

The researchers want to further develop numerical methods and algorithms in order to be able to investigate quantum systems in chemistry as well as particle and solid-state physics with the help of supercomputers and, in the future, quantum computers. "This is fundamental research," says Urbach. "But there are applications, particularly in chemistry, for example in battery research, and solid-state physics."

In addition to the University of Bonn, Forschungszentrum Jülich and the Max Planck Institute für Kohlenforschung in Mülheim/Ruhr are also involved. Co-speaker is Prof. Dr. Barbara Kirchner from the Clausius Institute for Physical and Theoretical Chemistry at the University of Bonn.

Collaborative Research Centers:

Collaborative Research Centers are long-term university research facilities lasting up to twelve years in which scientists work together as part of an interdisciplinary research programme. They enable innovative, challenging, complex and long-term research projects by coordinating and concentrating people and resources at the applicant universities. Cooperation with non-university research institutions is expressly encouraged. Collaborative Research Centers consist of a large number of sub-projects.

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Prof. Dr. Carsten Urbach from the Helmholtz-Institute for Radiation and Nuclear Physics at the University of Bonn is spokesperson for the new Collaborative Research Center "NuMeriQS".
Photo: University of Bonn