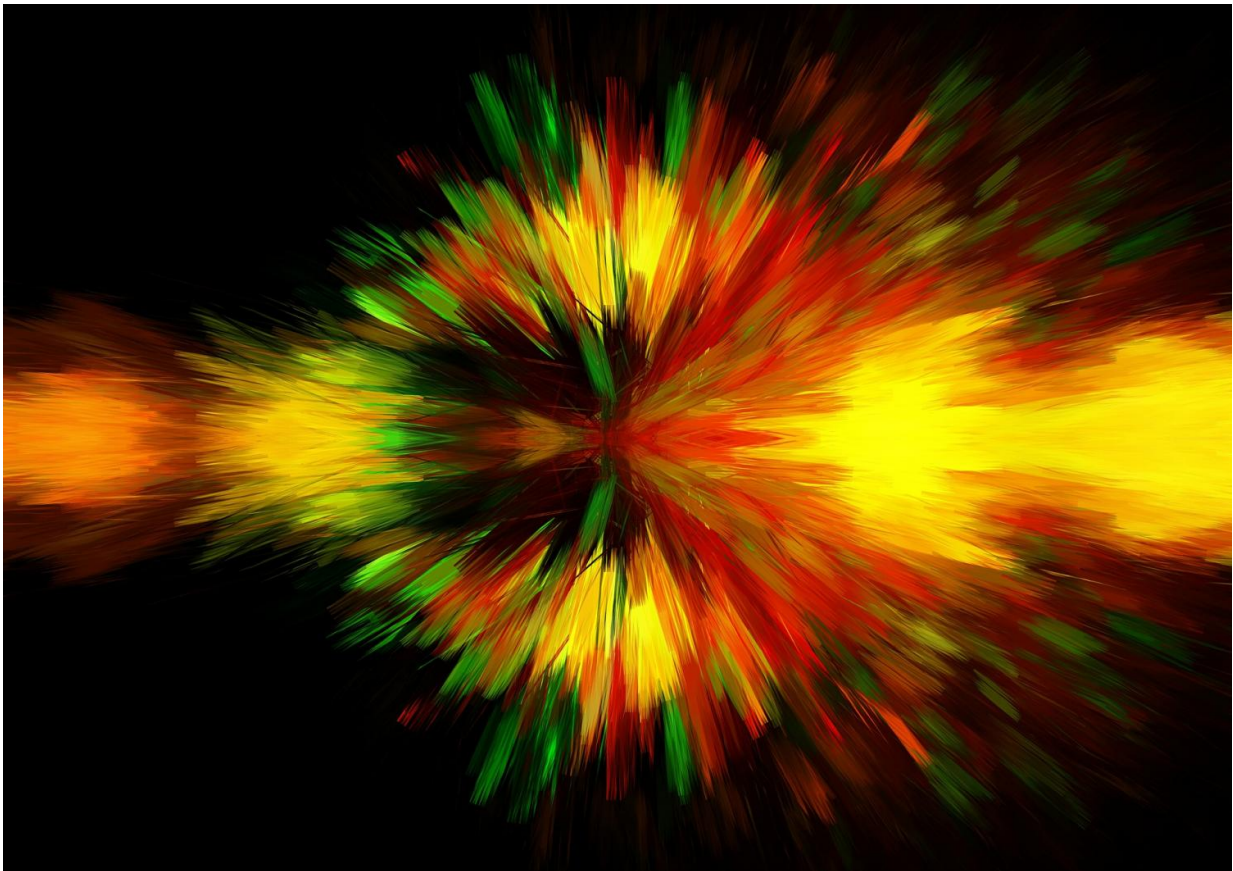


# Mapping the future direction for quantum research

August 15 2018

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The way research in quantum technology will be taken forward has been laid out in a revised roadmap for the field.

Published today in the *New Journal of Physics*, leading European quantum researchers summarise the field's current status, and examine its challenges and goals.

In the roadmap:

- Dr. Rob Thew and Professor Nicolas Gisin look at quantum communication, and when we may expect to see long-distance [quantum key distribution](#) networks
- Professor Frank Wilhelm, Professor Daniel Esteve, Dr. Christopher Eichler, and Professor Andreas Wallraff examine the state of quantum computing, and the timescale for delivering large-scale quantum computational systems
- Professor Jens Eisert, Professor Immanuel Bloch, Professor Maciej Lewenstein and Professor Stefan Kuhr trace quantum simulation from Richard Feynman's original theory through to the advances in [technology](#) needed to meet future challenges, and the pivotal role quantum simulators could play
- Professor Fedor Jelezko , Professor Piet Schmidt, and Professor Ian Walmsley consider the field of quantum metrology, sensing and imaging, and look at a variety of physical platforms to implement this technology
- Professor Frank Wilhelm and Professor Steffen Glaser examine quantum control, and the long-term goal of gaining a thorough understanding of optimal solutions, and developing a software layer enhancing the performance of quantum hardware
- Professor Antonio Acín and Professor Harry Buhrman highlight the current status and future challenges of this quantum software and theory structured along three main research directions: quantum software for computing, quantum software for networks, and theory.

Introducing the collection of articles, Dr. Max Riedel and Professor

Tommaso Calarco note: "Within the last two decades, quantum technologies have made tremendous progress, moving from Nobel Prize-winning experiments on quantum physics into a cross-disciplinary field of applied research.

"One success factor for the rapid advancement of [quantum technology](#) is a well-aligned global research community with a common understanding of the challenges and goals. In Europe, this community has profited from several EC funded coordination projects, which, among other things, have coordinated the creation of a quantum technology roadmap.

"We hope this updated summary proves useful to our colleagues in the research community, as well as anyone with a broader interest in the progress of [quantum](#) technology."

**More information:** "The Quantum Technologies Roadmap: A Community View" Acin et al 2018 *New J. Phys.* 20 080201, [iopscience.iop.org/article/10.1088/1367-2630/aad1ea](https://iopscience.iop.org/article/10.1088/1367-2630/aad1ea)

Provided by Institute of Physics

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