Micius Quantum Prizes for 2025

Quantum mechanics, discovered in the beginning of the last century, has been an enormously successful theory of nature, and has led to the development of many of today's most widely used technologies that have completely changed the landscape of our society. In recent decades, profound progress has been made, both in our understanding of the potential of exploiting quantum superposition and entanglement for entirely new ways of information processing and in our mastering of new experimental methods of coherent control of individual quantum particles and their interactions in larger quantum systems. These advances have given birth to the emerging field of quantum technologies, also known as the second quantum revolution. The first quantum revolution merely exploits naturally occurring quantization effects, while this second quantum revolution aims to engineer quantum systems to perform a new generation of classically impossible tasks ranging from unconditionally secure quantum communications, through extremely sensitive measurements to breathtakingly powerful quantum simulation and quantum computation.

To promote the second quantum revolution, a new science foundation, the "Micius Quantum Foundation" was established in 2018 thanks to generous donations from private entrepreneurs. This Foundation is named after *Micius*, an ancient Chinese philosopher who lived during a similar period to the Western philosopher Democritus. *Micius* strongly stood for peace, put forward the concept of "universal love", and performed original scientific works such as the pinhole experiment that proved light traveled in straight lines. His book contains some preliminary ideas of Newton's first law of motion, which states: "The stopping of motion is due to the opposing force... if there is no opposing force... the motion will never stop." *Micius* also held a belief that objects can not be infinitely divided into small pieces, but there is a smallest fundamental unit of a particle, a concept which coincides with our modern quantum physics.

One important mission of the Micius Quantum Foundation is to establish the "Micius Quantum Prize" and recognize the scientists who have made outstanding contributions in the field of quantum communications, quantum simulation, quantum computation, and quantum metrology. The revenue of the Micius Quantum Foundation is distributed in the form of prizes. Each honoree will receive a prize of 1.25 million Chinese yuan (after tax about 150,000 US dollars) and a 24K gold medal with a weight of 200g.

The Micius Quantum Prize recognizes significant science advances ranging from early conceptual contributions to recent experimental breakthroughs.

The Micius Quantum Prize 2025 focuses on quantum simulations in optical lattices. The laureates this year are Immanuel Bloch, Tilman Esslinger, and Markus Greiner.

- Immanuel Bloch, Max Planck Institute of Quantum Optics and LMU Munich
- Tilman Esslinger, ETH Zurich
- Markus Greiner, Harvard University

Citation: For the pioneering experimental realization of bosonic and fermionic Hubbard models in optical lattices as analog quantum simulators of strongly interacting many-body systems for comprehensive investigations of quantum phases, transport, and topological phenomena.

International Selection Committee (2025)

Chunli Bai, Charles Bennett, Yi Luo, Jian-Wei Pan, Frank Wilczek, David Wineland, Jun Ye, Anton Zeilinger, and Peter Zoller.

For more information, please visit our official website at http://miciusprize.org

Additional information

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