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Quantum Dynamics in Josephson Junctions and *Symmetry*

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closed (30 April 2023)

Message from the Guest Editor

Dear Colleagues,

A programmable quantum computer based on superconducting technologies has already demonstrated supremacy over the most powerful supercomputers in the world when solving a specially developed test problem. Existing quantum processors on Josephson junctions differ in the number and type of qubits, the number of interqubit connections, and their physical implementation. From the outside, such computers resemble a complex quantum system with sophisticated techniques for state control and read-out. This allows **Quantum Dynamics in Josephson Junction Systems** to be used for analyzing solutions to a number of problems from a wide variety of fields, including molecular chemistry, biology, periodic and quasiperiodic crystals, and pattern recognition. On the other hand, the accumulated methods of applying the "laws of symmetry" to physics, chemistry, biology, mathematics, and computer science can be used to improve Josephson quantum computers. These two mutually complementary features inspired us to start working on this multidisciplinary Special Issue of the *Symmetry* journal.

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Special Issue

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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