Special Issue

Quantum Information and Condensed Matter Physics

Message from the Guest Editors

Recent years have witnessed the emergence of novel materials and different, exotic systems and phases, whose description and analysis often go beyond the standard methods and require novel approaches and quantities to study. Traditional concepts, such as spontaneous symmetry breaking and strong correlations, have been extended or replaced by concepts from topology or highly entangled states. In this respect, quantum information theory offers a different perspective and provides a number of sought-after quantities to tackle these new physics. The emergent "second quantum revolution" and the new field of quantum information, which has been rapidly expanding in the past 2–3 decades, have provided an important application within the field of condensed matter problems. For instance, characterizing the entanglement of a given phase provides complementary information on the physical details of a given system, and by using the fidelity, quantum transitions between different phases can be detected and analyzed, in a way that is to some extent independent of the detailed knowledge of the system properties, such as order parameters.

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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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