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Symmetry in Statistical Mechanics and Complex Dynamical Systems

Guest Editor:

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Message from the Guest Editor

Symmetry, entropy and action are, arguably, the three main concepts at the heart of physics. Although the connections between symmetry and action have been long explored and are still the subject of intense research nowadays (from Galilean invariance to Noether's theorem and gauge field theories) those of symmetry and entropy, on one hand, and action and entropy, on the other, remain poorly understood.

The dynamical and statistical behavior of complex systems is strongly constrained by symmetry. These systems allow the interplay between symmetry, complexity, and entropy increase to be explored.

This Special Issue highlights symmetry applications and consequences in the dynamical behavior of complex systems whose trajectories can be computationally or analytically studied, as well as those for which insight can be gained by statistical mechanical methods. Dynamical systems will be explored paying special emphasis on those cases for which symmetry is helpful to establish structural features of the resulting attractors and complexity measures.

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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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