Special Issue

Interdisciplinary Statistical Physics, Neural Computation, and Complex Systems

Message from the Guest Editors

Statistical physics offers a versatile framework for understanding emergent phenomena in systems composed of many interacting components. Its methodologies, ranging from equilibrium and non-equilibrium statistical mechanics to stochastic thermodynamics and information theory, have found applications across diverse fields, including neuroscience, machine learning, biological systems, and beyond. This Special Issue seeks to highlight innovative research that leverages statistical physics to analyze, model, and optimize complex systems. We welcome contributions that apply statistical mechanics tools to problems in neural computation, neuroscience, and biologically inspired complex systems, with a focus on information processing and emergent dynamics.

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The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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