

Special Issue

Physics of Ionic Conduction in Narrow Biological and Artificial Channels

Message from the Guest Editors

Biological ion channels are essential to life in all its forms. It is now appreciated that an understanding of selective conduction requires physics, and that the physics of biological ion channels has a great deal in common with that of artificial nanopores. Large-scale molecular dynamics simulations are yielding atomistic and statistical insights into many channel properties as a function of structure. However, the ability to predict the function of a channel from its structure, e.g., following a point mutation of a biological channel or the functionalization of a nanopore, remains elusive.

Nonetheless, these recent advances have brought us tantalisingly close to a fundamental theory of ionic permeation, based on the statistical physics of ions within the channel. The Special Issue aims to bring together original high-quality papers on ionic permeation through narrow water-filled channels, both biological and artificial. It will include papers on the statistical physics of the process, on molecular dynamics and Brownian dynamics simulations, and on relevant experiments.

Guest Editors

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Message from the Editor-in-Chief

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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