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Free Volume in Thermodynamics

Guest Editor:

Prof. Dr. Purushottam D. Gujrati

1. Department of Physics, The University of Akron, Akron, OH 44325, USA
2. Department of Polymer Science, The University of Akron, Akron, OH 44325, USA

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Message from the Guest Editor

The concept of free volume and its distribution are used to explain molecular motion and compressibility in systems such as liquids and solids (amorphous or crystalline). Usually, free volume increases with increasing temperature, and so it is central to the concept of molecular motion, diffusion, mobility, cavity structures and emergent elasticity. For this reason, it plays an important role in thermodynamics such as in glass transitions, as evidenced by the spectacular success of the phenomenological Doolittle model. The experimental determination of free volume (e.g., through positron annihilation spectroscopy) and its explanation in terms of theoretical approaches (e.g., hole theory) or computer simulations (e.g., using Voronoi tessellation) depends on how free volume is defined. This Special Issue is an attempt to draw together various authors who can contribute to different aspects of this important field in thermodynamics, its historic development, and its relationship with other modern theories, such as the mode-coupling theory.

Prof. Dr. Purushottam D. Gujrati
Guest Editor

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Editor-in-Chief

Prof. Dr. Kevin H. Knuth
Department of Physics, University at Albany, 1400 Washington Avenue, Albany, NY 12222, USA

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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Contact Us

Entropy Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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