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Casimir Physics and Applications

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Message from the Guest Editors

Casimir-Lifshitz and Casimir-Polder forces, predicted by Casimir in 1948, generalize and transform the classic notion of van der Waals forces by including retardation effects. Advances in experimental techniques, as well as the revival of theoretical formalism based on multiple scattering theory have enabled this transformation. The aim of this Special issue is to cover the following topics:

Fundamental topics: positive and negative entropies; temperature issues; dispersion, dissipation, and out-of-equilibrium phenomena; Casimir friction; Casimir force related to surface tension; Casimir energies and stresses in inhomogeneous materials; calculating Casimir force using boundary integral equations; Casimir effect in curved space.

Applied topics: use of fluid mixtures to tune attractive-repulsive Casimir transitions; measurable effects for torques in anisotropic materials; effective polarizabilities of gas molecules dissolved in water Ice and quantum levitation; experimental signatures of Casimir repulsion and nonmonotonic effects; experiments and proposals for measuring the dynamical Casimir effect; use of the van der Waals density functional.

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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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