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Applications of Nanomaterials Beyond the Boundaries of Symmetry

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Deadline for manuscript submissions:
closed (30 November 2023)

Message from the Guest Editors

Dear Colleagues,

Next-generation electronic gadgets will be made from nanomaterials with unique and unprecedented electrical and magnetic properties that arise from the symmetry of the nano-structured materials. Spherical symmetry, which corresponds to the highest degree of geometrical symmetry, is naturally present in atoms. A high degree of degeneracy, a property of quantum energy levels wherein a particular energy level can simultaneously correspond to two or more distinct states in a quantum system, is a fascinating phenomenon that frequently results from symmetry. The maximum geometrical symmetry is seen in spherical atoms, which also exhibit a high number of quantum states, or degeneracy. It has long been thought that geometrical restrictions prevent any polyatomic species from growing larger than a sphere. An inflated tetrahedron, however, displays an unusual degeneracy that surpasses that of spherical atoms. It is possible to create nanomaterials with a higher degree of symmetry than spherical atoms...

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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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