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Higher Symmetries and Its Application in Microwave Technology, Antennas and Metamaterials

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Message from the Guest Editors

Artificial materials and surfaces are widely used in leaky-waves, holographic surfaces, band-gap materials, and graded-index flat lenses. However, their practical implementations are usually limited in terms of bandwidth, losses, fabrication precision, and input-matching. Approaches overcoming these limitations have recently been proposed through the implementation, or the breaking, of specific higher symmetries in each cell of the periodic medium. Spatial symmetries involve glide or twist symmetry, while an example of spatio-temporal symmetries is the parity-time symmetry.

Ultra-wide behaviors, large stop bands, wave propagation robust to defects and deformations are among the effects that can be achieved with these symmetries. They can lead to the novel generation of lenses, gap waveguides and filters with applications at millimeter-waves and higher frequencies: next-generation communication terminals, satellite communications, radio-astronomy, etc.

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Special Issue

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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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