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Symmetry in Fluid Flow II

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

Fluid flows sometimes exhibit symmetricity under certain conditions. However, such a symmetric flow is not always realized if such conditions are changed. For example, the plane Poiseuille flow, which exhibits a parabolic velocity profile formed between two parallel walls, has an exact symmetric solution of Navier-Stokes equation, but its symmetricity breaks under the condition of a high Reynolds number. This kind of flow transition from a steady symmetric state to another more complex state is not only realized in fluid flow experiments or analyses but also observed in natural fluid flow phenomena. The breaks of flow symmetry have been studied theoretically, experimentally, and numerically in the fields of fluid mechanics and thermal engineering because of their importance and relevance in terms of flow control and heat transfer enhancement. However, breaks of flow symmetry have not been sufficiently elucidated due to the non-linear characteristics of fluid flow. This Special Issue focuses on breaks of flow symmetry due to various kinds of factors such as shear, buoyancy, centrifugal force, and surface tension.

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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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