



Advances in Supermassive Black Holes

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Message from the Guest Editor

Supermassive black holes are key elements in resolving the structure formation and evolution of the Universe. They are ubiquitous from the early Universe, actively forming relativistic jets and deeply related surroundings. There are many unsolved problems for supermassive black holes, such as their extremely early formation, accretion, coevolution, relation to dark matter and cold flows, relation to the first stars, etc.

Despite 50 years of research on supermassive black holes, we still do not have a clear answer. There may be important factors that are not yet recognized among researchers. A variety of research from many aspects may bring us a hint for a new direction. This Special Issue is the place to collect such diversified research from observation and theories.

The problem may be solved by the synthesis of a variety of research: a bold hypothesis and solid deduction, precise observations and novel interpretation, any critical review, analysis from unusual perspectives, the hierarchy of black holes from stellar size to bigger, a mathematical approach, possible quantum aspect, BEC and SSB, symmetry aspects, etc.





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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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