



New Challenges in Cavity Magnonics and Symmetry

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Message from the Guest Editors

Dear Colleagues,

Cavity magnonics—the emerging interdisciplinary of cavity quantum electrodynamics and magnonics—has been rapidly developing in recent years. Cavity magnon-polaritons (CMPs) are a new type of bosonic quasiparticles caused by the hybridization of magnons and cavity photons, which has been detected and characterized via the anti-crossing transmission spectrum. The entangled spin orientation and photon number state in CMPs enables an efficient quantum information transfer between photon and magnon via Rabi oscillation, which is promising for quantum computing.

Recently, non-Hermitian physics and parity-time symmetry have attracted considerable attention. The non-Hermitian Hamiltonians allow the entirely real spectrum as long as the combined parity (P) and time (T)-reversal symmetries are respected. The non-Hermitian singularities, called exceptional points, have been experimentally observed in the cavity magnonic system. Conventional CMPs have a finite lifetime due to the intrinsic losses of photons and magnons. Pumping the cavity to compensate the dissipation may extend the coherent time of a CMP and lead to a dynamical equilibrium.....





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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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