

Emergent Spin-Related Phenomena with Artificially Broken Symmetry

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TIME **13:00 - 15:00**

VENUE Seminar room **A401, 4F**

Laboratory for Nanoelectronics and Spintronics, RIEC



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Phenomena like the spin Hall effect, Rashba effect, and Dzyaloshinskii-Moriya interaction are essential elements in converting charge currents into spin currents or creating topological spin textures such as skyrmions. Various structures with strong spin-orbit coupling have been studied to observe such phenomena. For that, the breaking of crystal symmetries has become an essential tool. This presentation aims to introduce my recent research results related to spin-dependent phenomena manifested in artificially broken symmetry systems as follows.

- Dzyaloshinskii-Moriya interaction arising from orbital asphericity [Nature communications 9 (1), 1648 (2018)]
- Bulk-like Rashba effect and Dzyaloshinskii-Moriya interaction in ABC-type superlattices [Advanced Science 10, 2206800 (2023); npj Computational Materials 7 (1), 129 (2021)]
- Field-free switching with artificially broken lateral symmetry [Acta Materialia 246, 118705 (2023)]
- Helical spin structure in the Fe₅GeTe₂ crystal and its non-linear transport behavior [Advanced Functional Materials 31 (17), 2009758 (2021)]