

# Emergent Spin-Related Phenomena with Broken Symmetry

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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.

- Bulk-like Rashba effect and Dzyaloshinskii-Moriya interaction in ABC-type superlattices [npj Computational Materials 7 (1), 129 (2021), Advanced Science 10, 2206800 (2023)]
- Field-free switching with artificially broken lateral symmetry [Acta Materialia 246, 118705 (2023)]
- Giant Modulation of Magnetoresistance in a van der Waals Magnet by In-Plane Current Injection [Advanced Materials 37 (10), 2414917 (2025)]
- Full SOT switching of magnetic octupole in Mn<sub>3</sub>Sn [under review]