## Spin-orbit entanglement and spin-momentum coupling

Hyun-Woo Lee\*

Department of Physics, Pohang University of Science and Technology

Spin-momentum coupling plays important roles in spintronics in various context including spin generation, spin transistor, and spin-orbit torque. Here we show that for the spin-momentum coupling to arise, the entanglement between spin and orbital degree of freedom is indispensible. We also discuss implications of the spin-orbit entanglement on spin split energy bands.