

Spin-orbit torque (SOT) is a phenomenon that arises from the spin Hall effect of charge currents. It is characterized by the generation of a spin current perpendicular to the direction of the charge current. This spin current exerts a torque on the magnetization of a ferromagnetic layer, leading to its precession and eventual switching. SOT is a key component in the development of spintronic devices, which aim to use the spin of electrons rather than their charge for information storage and processing. The SOT effect is often studied in the context of heavy metal/ferromagnetic bilayers, where the spin Hall effect of the heavy metal layer is used to generate the spin current. The efficiency of SOT is quantified by the SOT efficiency factor, which is a function of the material properties and the geometry of the device. Recent research has focused on optimizing the SOT efficiency and exploring new materials and device architectures for spintronic applications. The SOT effect is also being investigated for its potential in neuromorphic computing, where it can be used to emulate the behavior of synapses in the brain. The SOT effect is a promising area of research in the field of spintronics, and it is expected to play a significant role in the development of next-generation electronic devices.

