Spin current and Spintronics

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Spin current, a spin counterpart of electric current, refers to a flow of electrons' spin angular momentum in condensed matter. Spin current has been ignored in electromagnetism in matter for many years, since it disappears in a very short distance, typically at the sub-micrometer scale. However, recent developments in nanotechnology have enabled us to make minute structures. For example, in integrated circuits composed of nanoscale wires, spin current may become as important a quantity as electric current. Spin current can be detected using the inverse spin Hall effect: conversion of spin current into electricity in condensed matter. As a result, a lot of spin-current-related phenomena have been discovered.

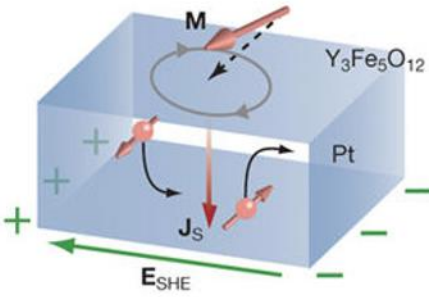

Figure 1. Concept of spin current.

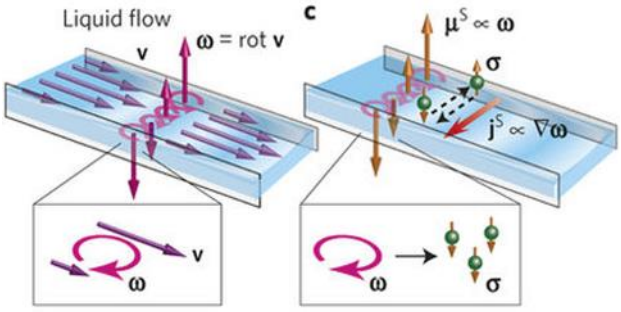

Figure 2. Concept of spin hydrodynamic generation.

Bibliography

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