



PHYSICS AND ASTRONOMY COLLOQUIUM

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" The impossible spin and its applications "

Abstract

The intrinsic angular momentum of the electron, long known to play a pivotal role in the structure of matter, is now being put to practical use in a host of new electronic devices. In this talk I review the basic physics that makes this possible, starting from the surprising emergence of the intrinsic magnetic moment of the electron in relativistic quantum mechanics, and proceeding to describe a slew of effects in which magnetism and electric currents become intertwined, allowing us to control one by means of the other: the spin Hall effect, the spin galvanic effect, various forms of magnetoresistance, and the spin transfer torque. As a final example I discuss the extreme case of "spin-momentum locking" in the class of materials known as topological insulators and the new possibilities created by this remarkable phenomenon.

Wednesday, January 31, 2018

3:30 p.m.

BWC Building

Room A104