All Optical Helicity Dependent Spin-Switching: A Young Physicist Back in the Big Easy

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Abstract: It is well known that the spin of an electron can be manipulated via an interaction with an external magnetic field. The phenomenon of all optical helicity dependent spin switching, or simply, all optical switching (AOS), is a more novel method of spin manipulation which can invert a given spin via an interaction with an electric field in the form of ultrafast laser pulse on femtosecond timescales. In the following study, we demonstrate AOS is possible through our theory, by applying left and right circularly polarized light to a small electron spin system. In applications, the spin-magnetic properties of ferrimagnetic, rather than (anti)ferromagnetic materials are better suited for AOS. These materials and AOS have applications ultrafast magnetic recording and memory devices. This work was presented at the American Physical Society (APS) 2017 March Meeting. We discuss the overall contents of the Undergraduate Curriculum at APS while reflecting on the benefit conferences such as APS have on the career development of young scientists and examine this career landscape.