The 18th Condensed Matter Physics Seminar of the 2015/2016 Series

will be presented in the James Fletcher Building (JFB), room 334 on Thursday, February 8, 2016 at 4pm by

Dali Sun

University of Utah
Department of Physics and Astronomy

Pulsed Inverse Spin Hall Effect in Organic Semiconductors and Organic Trihalide Perovskites

Organic semiconductors (OSECs) are promising materials for spintronics applications mainly because of the expected long spin relaxation time that originates from the light elements in their building blocks. Usually the OSEC are used in organic spintronics as interlayer between two ferromagnetic electrodes in organic spin-valve devices. In this case the spin-polarized carriers are generated in the OSEC by electrical ‘spin-injection’, and characterized by the giant magnetoresistance effect. Recently, however a second method for generating pure ‘spin-current’ has been introduced, namely ‘spin-pumping’ induced in the OSEC by resonant microwave absorption in a ferromagnetic substrate. This new method opens a new route for studying spin transport in OSECs, as well as spin-to-charge conversion obtained by the inverse spin-Hall effect, in spite of the inherent weak spin-orbit coupling in these materials. In this talk, I will describe a novel method of ‘pulsed spin-pumping’ that enables investigation of the inverse spin-Hall effect response in various OSECs ranging from π-conjugated polymers with strong SOC that contain intrachain platinum atoms, to weak SOC polymers, to C60 films, where the SOC is predominantly caused by the molecule surface curvature. I will also present recent studies of organometal trihalide perovskites spintronics using both ‘spin-pumping’ and ‘spin-injection’.