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Optical Detection of Injected Spin Aligned Carriers in Organic Semiconductors by Sagnac Interferometry[1] RYAN MCLAUGHLIN, ZHIHENG LIU, DALI SUN, Z. VALY VARDENY, University of Utah — Conventionally, spin-aligned carrier injection into organic semiconductors has been investigated by Giant magneto-resistance (GMR), which is inherently difficult to interpret due to the large number of artifacts in organic spintronic devices. Optical detection of spin injection would allow for the direct characterization of spin-polarized carriers without the need for spin-analyzer layers, but has been considered difficult to achieve due to the small spin-orbit coupling in organic semiconductors. A Magneto-Optic Kerr Effect (MOKE) sensitive Sagnac Interferometer offers a robust, highly sensitive approach for detection of spin polarization in semiconductors with weak spin-orbit coupling. We have successfully constructed a Sagnac Interferometer having ∼50 nano-radian resolution for the change in polarization angle. Here we describe several experiments using the Sagnac to study spin injection in a variety of organic and inorganic spintronic junctions and devices, by measuring the Kerr rotation induced by the spin aligned carriers, to unambiguously demonstrate the injection of spin-polarized current from the ferromagnetic electrode.

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