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Abstract for an Invited Paper
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Recent Advance in Organic Spintronics and Magnetic Field Effect¹

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In this talk several important advances in the field of Organic Spintronics and magnetic field effect (MFE) of organic films and optoelectronic devices that have occurred during the past two years from the Utah group will be surveyed and discussed. (i) Organic Spintronics: We demonstrated spin organic light emitting diode (spin-OLED) using two FM injecting electrodes, where the electroluminescence depends on the mutual orientation of the electrode magnetization directions [1]. This development has opened up research studies into organic spin-valves (OSV) in the space-charge limited current regime. (ii) Magnetic field effect: We demonstrated that the photoinduced absorption spectrum in organic *films* (where current is not involved) show pronounced MFE [2]. This unravels the underlying mechanism of the MFE in organic devices, to be more in agreement with the field of MFE in Biochemistry. (iii) Spin effects in organic optoelectronic devices: We demonstrated that certain spin 1/2 radical additives to donor-acceptor blends substantially enhance the power conversion efficiency of organic photovoltaic (OPV) solar cells [3]. This effect shows that studies of spin response and MFE in OPV devices are promising.

In collaboration with T. Nguyen, E. Ehrenfreund, B. Gautam, Y. Zhang and T. Basel.

[1] Nguyen *et al.*, *Science* 337, 204 (2012);

[2] Gautam *et al.* PRB 85, 205207 (2012);

[3] Zhang *et al.* *Nature Commun.* 3, 1043 (2012).

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