

Abstract Submitted
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Electrical detection of nuclear spins in organic light-emitting diodes¹ H. MALISSA, M. KAVAND, D.P. WATERS, J.M. LUPTON, Z.V. VARDENY, B. SAAM, C. BOEHME, Department of Physics and Astronomy, University of Utah, Salt Lake City, Utah — We present pulsed combined electrically detected electron paramagnetic and nuclear magnetic resonance experiments on MEH-PPV OLEDs. Spin dynamics in these structures are governed by hyperfine interactions between charge carriers and the surrounding hydrogen nuclei, which are abundant in these materials. Hyperfine coupling has been observed by monitoring the device current during coherent spin excitation [1]. Electron spin echoes (ESEs) are detected by applying one additional readout pulse at the time of echo formation [2]. This allows for the application of high-resolution spectroscopy based on ESE detection, such as electron spin echo envelope modulation (ESEEM) and electron nuclear double resonance (ENDOR) available for electrical detection schemes. We conduct electrically detected ESEEM [3] and ENDOR [4] experiments and show how hyperfine interactions in MEH-PPV with and without deuterated polymer side groups can be observed by device current measurements.

[1] D. R. McCamey et al., Phys. Rev. Lett. 104, 017601 (2010).

[2] W. J. Baker et al., Phys. Rev. Lett. 108, 267601 (2012).

[3] M. Fehr et al., Phys. Rev. B 84, 193202 (2011).

[4] F. Hoehne et al., Phys. Rev. Lett. 106, 187601 (2011).

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