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Role of photogenerated meta-stable polarons in organic magnetoresistance: evidence for polaron pair mechanism[1] BHOJ GAUTAM, THO NGUYEN, Z. VALY VARDENY, University of Utah — We studied the magnetoconductance (MC) in *homopolar* organic diodes based on semiconductor polymers MEH-PPV and DOO-PPV. In dark we measured negative MC in both MEH-PPV and DOO-PPV homopolar devices, which was previously interpreted as due to magnetic field effect on singlet yield of polaron pairs having the same charge, known in the literature as the "bipolaron" mechanism. We investigated the role of photogenerated meta-stable polarons on the MC, when illuminating the device with a cw laser beam at various intensities and illumination times. Such illumination is known to produce metastable polarons that are deep-trapped in MEH-PPV polymer, but less so in DOO-PPV polymer. Upon illumination we obtained a gradual change in the MC magnitude and magnetic field response, where the MC first decreases then changes sign from negative to positive with the illumination time. Similar effects were not obtained in DOO-PPV devices. We therefore conclude that the metastable polarons in the illuminated polymer initiate the formation of polaron pairs with opposite charge in the homopolar device upon current injection; and these are therefore responsible for positive MC. This photoinduced MC is in agreement with a similar effect found in MC of *bipolar* organic diodes upon increasing the bias voltage beyond the threshold for bipolar injection.

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