

Abstract Submitted  
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**Probing inter- and intrachain coupling in P3HT using time resolved spectroscopy**<sup>1</sup> BHOJ GAUTAM, ROBERT YOUNTS, CONG MAI, HARALD ADE, Department of Physics, North Carolina State University, Raleigh, NC 27695, USA, CHRISTOPH HELLMANN, NATALIE STINGELIN, Department of Materials and Centre for Plastic Electronics, Imperial College, London, UK, KENAN GUNDOGDU, Department of Physics, North Carolina State University, Raleigh, NC 27695, USA — The change in relative intensity of 0-0 to 0-1 peaks and the considerable shift in the absorption /emission spectra have been taken as the tool to distinguish the H-like and J-like aggregation (i.e., to address the interchain and intrachain coupling). In order to elucidate whether or not only linear absorption or photoluminescence (PL) can account for this, we studied the absorption, PL and the time resolved spectroscopy of P3HT in two different forms: pristine film and films blended with polar additive PEO. The red shift in 0-0 absorption peak and significant change in the relative intensity of 0-0 to 0-1 peaks upon blending indicates the change in aggregation from H-like to J-like. Surprisingly, we did not see a significant change in either the relative intensity of 0-0 to 0-1 peaks in the PL spectrum or the long time decay dynamics of the time resolved PL, suggesting both samples show H-like behavior. Here we address these contradictory observations by time resolved absorption measurements. We observed that the electronic coupling is a dynamics process evolving from J-like to H-like within a few hundred picoseconds. Our observations indicate that charge separation dynamics in P3HT is mostly governed by the very early dynamics.

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Bhoj Gautam  
Department of Physics, North Carolina State University,  
Raleigh, NC 27695, USA

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