

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Ultrafast Measurement Confirms Charge Generation through Cold Charge Transfer States¹ BHOJ GAUTAM, ROBERT YOUNTS, North Carolina State University, LIANG YAN, University of North Carolina at Chapel Hill, EVGENY DANILOV, HARALD ADE, North Carolina State University, WEI YOU, University of North Carolina at Chapel Hill, KENAN GUNDOGDU, North Carolina State University — The role of excess energy in generation and extraction of charges through charge transfer (CT) states in polymer solar cells is a subject of debate. There are reports suggesting increase of charge generation yield with excess energy based on ultrafast experiments. On the other hand time delayed collection field measurements shows that excess photon energy has no effect in photovoltaic efficiency. Here we resolved this discrepancy by studying the dynamics of CT excitons and polarons in blends of medium gap copolymers. We found that low-lying charge transfer (CT) excitons can generate charges over a long time period (nanosecond) and contribute photocurrent on the bulk heterojunction devices. By performing resonant CT excitation as well as above gap excitation transient absorption measurements we investigated that the charges are generated more efficiently through low-lying CT states in efficient devices independent of excitation energy.

¹This work is supported by Office of Naval Research grant N000141310526 P00002

Bhoj Gautam
Department of Physics, North Carolina State University,
Raleigh, North Carolina 27695, United States

Date submitted: 14 Nov 2014

Electronic form version 1.4