Abstract Submitted
for the TSF11 Meeting of
The American Physical Society

Surface Plasmon Enhancement of Organic Solar Cells DAVID SHOPE[1], JENNIFER STEELE[2], Trinity University — Organic photovoltaic (OPV) devices are inherently less efficient than silicon based devices. The short electron diffusion lengths in OPVs require the cells to be kept thin, diminishing their light absorption. One way to increase the absorption of these devices is to launch surface plasmons (SPs) along one of the electrodes at specific wavelengths in the solar spectrum. SPs are coherent electron oscillations that exist at the surface of a metal-dielectric boundary, and serve to focus light at the metal surface. This increase in absorption ultimately impacts the overall efficiency of the device. The OPV cells are fabricated on top of glass slides and consist of an organic heterojunction active layer residing between ITO and aluminum electrodes. SP coupling is achieved by forming sinusoidal gratings of various periods along the active layer/Al electrode boundary. Efficiency measurements of patterned and unpatterned samples were taken to determine if the gratings have any effect on the cell efficiency at the predicted wavelengths. No significant changes in efficiency have been observed, which could be due to the abnormally low efficiencies of the devices that were tested.

[1]Department of Chemistry and Physics
[2]Department of Physics and Astronomy

Jennifer Steele
Trinity University

Date submitted: 22 Sep 2011 Electronic form version 1.4