2011 Materials Research Society Fall Meeting
November 28 – December 2, 201,
Boston Massachusetts USA
SESSION J3: Novel Concepts for New Generation Photovoltaics II
Chairs: Peter Bermel and Dim-Lee Kwong
Tuesday Morning, November 29, 2011
Republic B (Sheraton)

9:00 AM J3.2
Separating Optical and Electronic Pathways with the Nanocoax Photovoltaic Architecture. Michael J. Naughton and Michael J. Burns; Department of Physics, Boston College, Chestnut Hill, Massachusetts.

The nanocoax architecture [1,2], consisting of an array of metal nanowire cores surrounded by a radial PV junction and a second conductor, uniquely orthogonalizes optical and electronic pathways in photovoltaics, leading to enhanced light trapping and carrier extraction [3,4]. Such a configuration has opened possibilities for increased efficiency and decreased film thickness for any PV medium that suffers from the "thick-thin" problem and can be processed in conformal film form. For amorphous silicon PV, this ability to increase efficiency while reducing film thickness has the added benefit of significantly reducing Staebler-Wronski degradation. We previously exceeded 10.5% NREL-certified initial efficiency in single junction a-Si [5]. In this talk, we will review the attributes of the nanocoax architecture, via experiment and simulations, toward pursuit of radial multijunction thin film a-Si nanocoax technology (including flexible) with efficiencies well in excess of existing planar or nanostructured configurations. [1] U.S. Patents 7,589,880, 7,754,964, and 7,943,847. [2] J. Rybczynski et al. Appl. Phys. Lett. 90, 02114 (2007). [3] M.J. Naughton et al., Phys. Stat. Sol. RRL 4, 181 (2010). [4] T. Paudel et al., Phys. Stat. Sol. 208, 924 (2011). [5] http://www1.eere.energy.gov/solar/review_meeting/pdfs/prm2010_pvposter_naughton.pdf