

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Photon Enhanced Thermionic Emission for Solar Concentrator Systems JARED SCHWEDE, IGOR BARGATIN, DAN RILEY, BRIAN HARDIN, ROGER HOWE, NICK MELOSH, ZHI-XUN SHEN, Stanford University — Photon Enhanced Thermionic Emission (PETE) is a newly proposed method of solar energy harvesting which combines quantum and thermal processes into a single electricity generating mechanism. The proposed PETE device can be thought of as a synthesis of a photovoltaic (PV) cell and thermionic converter, and the process is expected to overcome some of the challenges which limit either of its intellectual antecedents. Because PETE can harvest the energy of sub-bandgap photons and recover heat produced by thermalization and recombination, possible PETE conversion efficiencies exceed the theoretical limits of single junction PV cells. A PETE converter operates most efficiently at high temperatures, which would allow the waste heat of the device to be used to power a secondary thermal cycle. Principles of PETE operation and limiting efficiencies are described.

Jared Schwede
Stanford University

Date submitted: 20 Nov 2009

Electronic form version 1.4