

Abstract Submitted
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Analytical solution for Shockley-Queisser model: Fundamental relations for conversion efficiency¹ ANDREI SERGEEV, KIMBERLY SABLON, US Army Rsch Lab - Adelphi — We present analytical solution for photovoltaic conversion efficiency in general Shockley-Queisser model, which assumes thermal and chemical equilibrium between photoelectrons and emitted photons. In this model photoelectrons and phonons are described by the same chemical potential, which provides the useful energy per electron. Our results show that at the electric current which delivers maximal conversion efficiency the emission energy per absorbed photon exactly equals kT . We compare the obtained results with thermodynamic limitations and discuss some paradoxes related to thermodynamics of photovoltaic conversion.

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