Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Modeling the generation of hot plasmonic electrons in metal nanocrystals with hot spots. A quantum model. LUCAS V. BESTEIRO, XIANG-TIAN KONG, ALEXANDER O. GOVOROV, Ohio University — To efficiently harvest energy from electromagnetic radiation is a goal actively pursued in different fields within material science and chemistry. Combining plasmon-supporting nanostructures with energy harvesting systems provides access to a variety of microscopic phenomena that can increase collection rates or extend the spectrum usable by those systems. Such a pairing can be used to increase the efficiency of photochemical processes and photovoltaic systems, and to make more sensitive photodetectors. The work presented here [1] focuses on the excitation of high energy (hot) carriers within a plasmonic nanoparticle under continuous irradiation. Energetic carriers can then become available to neighboring materials, enhancing their intrinsic light-harvesting efficiency. We have used a hybrid theoretical framework adapted from the previous work [2-4], which combines classical electrodynamic calculation of the plasmonic response with a quantum description of the carriers. We use this model to describe the non-equilibrium carrier population distribution within a system of two interacting nanoparticles with an electromagnetic hot spot, attending to the effects of the field enhancement occurring because of this interaction. [1] Besteiro, L.V.; Govorov, A.O. *J. Phys. Chem. C* **120**, 19329 (2016). [2] Govorov, A.O.; Zhang, H.; Gun'ko, Y.K. *J. Phys. Chem. C* **117**, 16616 (2013). [3] Zhang, H.; Govorov, A.O. *J. Phys. Chem. C* **118**, 7606 (2014). [4] Govorov, A.O.; Zhang, H. *J. Phys. Chem. C* **119**, 6181 (2015).

Lucas Vazquez Besteiro
Ohio University

Date submitted: 03 Nov 2016 Electronic form version 1.4