Abstract Submitted
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Tracking the non-linear optical response in plasmonic nanoparticles with strong-field photoemission spectroscopy[1] JIANXIONG LI, Louisiana State University, J. POWELL, INRS-EMT, A. SUMMERS, ICFO, S.J. ROBATJAZI, Kansas State University, M. DAVINO, UConn, P. RUPP, LMU, Munich, C.M. SORENSEN, D. ROLLES, Kansas State University, M.F. KLING, LMU, Munich; MPQ, C. TRALLERO-HERRERO, UConn, A. RUDENKO, UWE THUMM, Kansas State University — Femtosecond optical interactions with nanometer-sized metallic structures hold strong promise to enhance our understanding of the transient electronic response of solid matter and enable novel applications in ultrafast electro-optical devices [1]. In order to probe the transient optical response of such structures, we exposed solid gold nanospheres and gold spherical shells with silica cores to intense pulses of infrared light and measured the emitted photoelectron cut-off energy [2]. To better understand the measured photoelectron cut-off energy spectra as functions of intensity, we employed Mie theory to simulate intensity-dependent plasmonic fields, with the inclusion of the non-linear optical effects. We found conclusive evidence that, for thin-layered nanostructures, the non-linear optical response has a significant impact on the plasmonic fields and photoemission process. This intensity-sensitive nonlinear effect in thin layered structures can be exploited to constitute an ultrafast optical switch. [1] J. Li et al., *Phys. Rev. Lett.* 120, 223903 (2018). [2] J. Powell et al., *Opt. Express* 27, 27124 (2019).

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Jeffrey Powell
INRS-EMT

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