Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Influence of surface plasmon polaritons on heating of gold after irradiation with ultrashort laser pulses PAVEL N. TEREKHIN, Technical University of Kaiserslautern, Kaiserslautern, Germany; NRC Kurchatov Institute, Moscow, Russia, SEBASTIAN T. WEBER, PASCAL D. NDIONE, BAERBEL RETHFELD, Technical University of Kaiserslautern, Kaiserslautern, Germany — We present a detailed investigation of surface plasmon polaritons (SPPs) excitation and decay after irradiation of gold with ultrashort laser pulses. SPPs can be created at a defect structure of an Au surface. Our aim is to show the influence of the electrical field enhancement resulting from SPPs on heating of a metal. We achieve this goal by developing an extended two-temperature model (TTM) which takes into account the interaction of hot electrons with an additional plasmon subsystem. The developed method for calculation of materials' heating after ultrashort laser irradiation allows to study the fundamental mechanisms of laser energy absorption. It also can be used to study the morphological effects and nanostructuring for the technological applications.

Pavel N. Terekhin
Technical Univ. of Kaiserslautern; NRC Kurchatov Institute

Date submitted: 05 Feb 2018 Electronic form version 1.4