Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Laser-pulse propagation and interaction with low-temperature electron-hole plasmas in nanowire arrays[1] RACHEL COOPER, JEREMY GULLEY, Kennesaw State University — We present results from finite-difference time-domain simulations solving for the electric and magnetic fields of ultrashort laser pulses. These laser fields propagate through arrays of semiconductor quantum wires, in which they excite and interact with a low-temperature electron-hole plasma. These low-temperature plasmas are driven by ultrashort laser pulses, electron-hole scattering between all energy bands, and resistive forces for momentum relaxation due to Coulomb scattering and collisions with the lattice. The simulations allow us to study the correlation between the localized plasma response of quantum wires and the spatial-temporal features and phases of the scattered laser pulses. Presented results showing the influence of these effects on the quantum wire polarization and current density may inform studies of optical high-harmonic generation, while the results on plasma mobility can further our understanding of ultrafast electronics.

[1]This material is based upon work supported by the National Science Foundation under Grant No. PHY 1903462.

Jeremy Gulley
Kennesaw State University

Date submitted: 29 Jun 2020 Electronic form version 1.4