

**December 13<sup>th</sup>**, 2021 10:00 AM

QED & Materials seminar

**Wenwen Mao**

**Title**

“THz-induced high-order harmonic generation and nonlinear transport in graphene”

**Abstract**

Employing the quantum master equation with phenomenological relaxation, we theoretically study the nonequilibrium dynamics of THz-induced high-order harmonic generation in graphene. We first performed fully dynamical simulation to investigate the high-order harmonic generation in graphene induced by THz laser fields. We found that the emitted harmonics is enhanced with the increase in the chemical potential, and this observation is consistent with the recent experiments. Then we introduce a quasi-static picture to develop the microscopic understanding of the THz-induced currents and the population distribution of conduction band in graphene from the viewpoint of a nonequilibrium picture of electron dynamics. The nonlinear electric conductivity of graphene is also investigated under static electric fields for various field strength and chemical potential shifts. The impact of electron temperature change is also investigated to compare with the thermodynamic model in the previous work.