2D Particle-in-cell Simulation of Terahertz Generation from Gas being Ionized by Two-color Laser J.-H. Shin

Plasma generated by twocolor laser is one of the strongest source of THz light, whose application ranges from detection of biological agents, tumors, and concealed weapons to nonlinear photonics.

Particle-in-cell simulations with supercomputer allowed to rigorously simulate the interaction between lasers and plasmas, which is precious for understanding the process of THz light generation and its optimization.

Sim. box: 2400/k_x x 5000/k_y Sim. time: 20000/ ω_{SH} CPU number: 16 (MPI2) CPU time: ~ 10 Hours Memory: 10 GB



Fig: Evolution of electric field of laser along with THz light generated.

Fundamental: 2.4 x 10¹⁵ rad/s, $I_F = 10^{16}$ W/cm², p-polarization Second Harmonic: 0.3 I_F , same polarization Lasers are irradiated from the right side of the simulation box. Initial Gas: N₂, 1 atm, 22.5°