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Low frequency electromagnetic emission from an interaction between carbon nanotubes and two frequency lasers[1] TOSHIHIRO TAGUCHI, Setsunan University, THOMAS ANTONSEN, HOWARD MILCHBERG, University of Maryland — Single-walled carbon nanotube is one of exotic material as a target for laser-plasma interaction. Carbon nanotubes are vertically grown on a substrate and they look like nano-scale woods. One of our previous simulation results shows that a nano scale cylindrical cluster largely absorbs laser energy when the laser intensity exceeds a certain critical value. This is because the strongly heated electrons coherently oscillate in a deep electrostatic potential formed by expanded fast electrons and rest ions. Since this electrostatic potential is symmetric due to the symmetry of a cylinder, the single mode laser irradiation only excites odd harmonics. When we intend to excite even harmonics or subharmonics, an another frequency laser must be simultaneously irradiated to the target in addition to the original laser. We will show 0 frequency mode excitation caused by nonlinear coupling between two frequency lasers, ω and 2ω, using our collisional-ionization PIC code. Enhancement of the low frequency radiation from periodically aligned carbon nanotubes will also be discussed.

[1] T. Taguchi, et al. Optics Express 18, 3, (2010), 2380.

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