

Abstract Submitted
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Selective emission of low frequency electromagnetic wave due to an interaction between strong laser field and single-walled carbon nanotubes¹ TOSHIHIRO TAGUCHI, Setsunan University, THOMAS ANTONSEN, University of Maryland, MASAHIKO INOUE, Setsunan University — Interaction between an intense laser light and carbon nanotubes (CNT) is one of hot topics in laser plasma research. A large number of vertically synthesized CNT, which is called a single-walled carbon nanotube (SWNT) is often used as a target with absorption coefficient much larger than a flat material. We have been investigating the laser-SWNT interaction in order to develop a low frequency coherent radiation source. According to our 2D PIC simulation, when the laser intensity becomes high enough, nonlinear interaction between the strong laser and CNT has a capability to generate sub-harmonics of the laser wavelength. When the height of a nanotube is longer than the laser wavelength, the electromagnetic wave can penetrate through void between nanotubes and will be trapped in the void. When the distance between two neighboring nanotubes is adjusted to the wavelength emitted by the nonlinear process, the nanostructure is expected to work as a selective emitter of a low frequency electromagnetic wave. We will present recent studies about the interaction between strong laser and long carbon nanotubes analyzed by an electromagnetic PIC code. In the presentation, we will show the electromagnetic field excited inside the nanotube region and emission spectrum observed outside.

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