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Effects of high intensity Laser Plasma Interaction on hydrodynamic simulations[1] TAKERU HATANAKA, Osaka University, KUNIOKI MIMA, The Graduate School for the Creation of New Photonics Industries, MASAYASU HATA, HIDEO NAGATOMO, Osaka University — Hydrodynamic simulations of laser plasma do not take account of LPI that are induced by the intense laser(I_L $>10^{15}$ W/cm^2). In order to improve the accuracy of hydrodynamic simulation in LPI regime, development of numerical model of LPI is necessary. We evaluate effects of LPI related to hydrodynamic simulations using a 1-D PIC code. Assuming the laser wavelength and intensity are 0.5 micron and 10^{16} W/cm^2 respectively, intensity exceeds LPI thresholds[1] and we should think absolute and convective SRS and SBS. We conducted several simulations with the different plasma scale lengths(100, 200, and 300 micron). Laser intensity is set to 10^{16} W/cm^2. In the results, due to the SRS and SBS, reflected light shows periodic behavior and the period depends on the plasma scale length. Scattered light at $n_{cr}/4$ by the SRS is scattered again at $n_{cr}/16$ and a density cavitation is observed there. This procedure is called Raman cascade. In case of 100 micron of the plasma scale length, a density cavitation at $n_{cr}/16$ did not appear. We discuss the detail of characteristics, and implementation into hydrodynamic codes in this presentation.

[1]K. Tanaka et al., Phys. Rev. Lett. 48, 1179(1982)

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