Numerical Simulation of Formation and Properties of Electron Solitary Cavities in Inertial Fusion

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Formation of short solitary cavities with trapped electromagnetic wave and their heating effect are important in inertial fusion (see [1-5]). In this paper formation, properties and heating effect of this electron solitary cavity have been numerically simulated. The numerical simulation has been performed in the models of immovable and mobile plasma ions. One can conclude that in the case of immovable ions the cavity formation is determined only by plasma electron dynamics and not by plasma ion dynamics. By numerical simulation it has been shown that in inertial fusion before $z<z_{cr}$ critical point (located inz_{cr}) mirrors - channels of reduced plasma electron density can be formed. These channels-traps can be coupled with formed solitary cavities in inertial fusion in critical point $z\approx z_{cr}$. It has been shown that half wavelength of electromagnetic wave is placed inside the cavity. Therefore electromagnetic field is oscillated fast inside the cavity. These cavities lead to some plasma electron energization due to nonstationary dynamics of their electromagnetic field. This energization is determined by fast oscillation of the trapped electromagnetic field in the cavity and could be determined by plasma electron trapping by electrostatic field of the cavity. We assume that the cavity is formed due to electromagnetic field trapping by the soliton, moving with the thermal velocity of plasma electrons, similar to [6-8].

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