Electron emission from laser produced nanoplasma.

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Nowadays interaction strong laser fields (10^{13} – 10^{16} W/cm^2) with nanosized objects is a very popular issue. As in the bulk case, the electromagnetic radiation can interact only with the electrons and causes their rapid heating and ionization of atoms. The result is the nanosized object with a relatively high electron temperature density and degree of ionization. It's called nanoplasma. A more precise definition and the associated limitations can be found in the article [1].
One of the distinguishing features of the nanoplasma is the violation of the plasma neutrality [1]. Due to the laser ionization and further thermionic emission from the plasma surface, the object gains an uncompensated positive charge. Concerning a small number of particles in the plasma under consideration ($10 - 10^6$), this charge determines the rate of plasma expansions affects the rate of ionization-recombination processes, electron density profile, and optical properties of the cluster plasma [1-3].
This paper presents a theoretical model of emission current from nanoplasma. The model consists of a system of ordinary differential equations. The derived expression is based on results of molecular dynamic modeling [4-5]. The paper discusses the details of applicability of the model and its advantages and disadvantages. Comparison with a series of experiments [6-9] is presented. The suggested system of equations allows generalizing the experimental results and giving a new explanation of some of them.
Some of the presented results can be found in the article [10].
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