

## **Ponderomotive modification of the electron density distribution in the interaction of high power microwave field with a plasma**

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Using the Maxwell and fluid equations and considering the high power microwave ponderomotive force acting on the plasma electrons, we investigate the interaction of a high power microwave fields with a underdense plasma. It is well known that the nonlinear interaction of a high power microwave field in the wide range of phenomena is connected with the ponderomotive Miller force. In general, the ponderomotive force is characterized by a nonlinear (quadric) dependence on the amplitude of electric field oscillations. This force is also known as the gradient ponderomotive force i.e., it is proportional to the gradient of the wave intensity. Therefore, it is related to a spatial inhomogeneity of the wave field. We assume the electron density slightly less than the critical density, the MW energy flux around  $I \cong 10^7-10^8 W/cm^2$ , the electron temperature  $T_e \cong 2eV$  and the microwave frequencies  $f = 2.45-10GHz$ . Therefore, using the Maxwell's equations and the balance between the ponderomotive force acting on the plasma electrons with the electrons pressure gradient force, we find the electron density distribution and the nonlinear differential equation for the electric field in the plasma. The solution of this equation shows that the profile of the field have nonsinusoidal shape. Also, the electron density profile shows that the electron density becomes highly steepened for the higher microwave energy flux and near the critical density.