

## **Investigation and modeling of the free-electron density and temperature during the formation of laser-induced breakdown of plasma in air at various laser parameters**

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The free-electron density equation and two temperature coupled equations during laser-induced ablation of air at atmospheric pressure are solved. In doing so, calculations were carried out to determine the comparative contribution of the mechanisms responsible for electron gain and losses in LIB of air. The solutions are initially obtained for the energy sources with a Gaussian distribution to describe the contribution of different pulse-width regimes. More general results provided in this study maintain the appealing aspects of other approximate solutions and reduce them under the respective conditions. Obtained results agree well with the numerical and experimental observations reported in the literature.