

# On the use of shockwave models in laser produced plasma expansion ( Conference Paper )

[De Posada, E.<sup>a</sup>](#), [Arronte, M.A.<sup>a</sup>](#), [Ponce, L.<sup>a</sup>](#), [Rodríguez, E.<sup>a</sup>](#), [Flores, T.<sup>a</sup>](#), [Lunney, J.G.<sup>b</sup>](#)

<sup>a</sup> Centro de Investigación en Ciencia Aplicada Y Tecnología Avanzada, Unidad Altamira, Tamaulipas, Mexico

<sup>b</sup> School of Physics, Trinity College Dublin, Ireland

## Abstract

Interaction of medium to high peak power laser pulses with solid materials produces a plasma that expands supersonically. Expansions of such plasmas have been studied and several models have been proposed to describe it. This work presents a study of the expansion of laser produced plasmas in both vacuum and gas environment by using Langmuir probe and photography. It compares some of the most used models to identify that which better describes the expansion process. In vacuum, such process is properly described by the Anisimov model. However when expanding in a background gas it is found that the Sedov-Taylor model fits properly the position of generated shockwave but overestimates both kinetic energy and pressure of the expanding plasma. Such problem is solved by using a modification of the Freiwald-Axford model. Finally it is

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demonstrated that after the plasma stopping distance the plasma enters in a diffusive regime.