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Special Issue Reprint

Advances in Laser Produced Plasmas Research

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The world of laser matter interaction has known great and rapid advancements in the last few years, with a considerable increase in the number of both experimental and theoretical studies. The classical paradigm used to describe the dynamics of laser produced plasmas has been challenged by new peculiar phenomena observed experimentally, like plasma particles' oscillations, plume splitting and self-structuring behavior during the expansion of the ejected particles. The use of multiple complementary techniques has become a requirement nowadays, as different aspects can be showcased by specific experimental approaches. To balance these non-linear effects and still remain tributary to the classical theoretical, views on laser produced plasma dynamics novel theoretical models that cover the two sides of the ablation plasma (differentiability and non-differentiability) still need to be developed. Plasma is a strongly nonlinear dynamic system, with many degrees of freedom and other symmetries, favorable for the development of ordered structures, instabilities and transitions (from ordered to chaotic states). In such contexts, we showcased research based on global and local symmetries, complexity and invariance. This special number highlighted exciting new phenomena related to laser produced plasma dynamics with the implementation of theoretical models, towards understanding the complex reality of laser matter interaction.



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