

Scholarship preliminary report

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Research studies : (*Trends in spectroscopic plasma diagnostics*)

Aim :

To study the high power laser-Nan materials interaction, and to understand the state of plasma formed which can be fully specified by two main plasma parameters that are measured experimentally, the electron density (n_e) and the electron temperature (T_e).

Research lines:

1. The main technique used in such measurements is called (LIBS) an acronym derived from the first letter of the statement "Laser Induced Breakdown Spectroscopy".
2. It deals with the utilization of light emitted from the plasma generated by the interaction of a high power lasers with matter (solid, liquid, or gas). Assuming that this light is sufficiently influenced by the characteristic parameters of the plasma, the analysis of this light will give us full information about the structure and the basic physical processes in plasma.
3. Our target is to study the plasma parameters for Nanomaterials targets such as (Al, Carbon, gold..etc.) Utilizing the first member of Balmer series appeared in the plasma emission (the H_α line) at 656.27 nm. Historically this line was successfully used to diagnose several kinds of plasma in different fields.

Moreover, to examine the outcome of the Nanomaterials study, we intend to compare the parameters of the study with the parameters of the macro (bulk) samples for the same element materials.