

Investigation of Re-deposition Dynamics of Laser-Ablated Material During Laser Cleaning

Abstract

Laser–surface interactions have attracted extensive research attention because of it's a wide range of applications and fundamental understanding of phenomenon happening during the process [1-3]. When a nanosecond laser irradiates a solid surface, processes such as absorption, plasma formation, plasma expansion and propagation can occur, producing permanent surface modification or nanostructuring in the surface. Laser-induced surface structuring finds applications across etching, surface cleaning, PLD, laser welding etc. [4-6]. Recent observations show that re-deposition of ablated mass on the substrate rear ablation of aluminium thin film [7]. However, the theoretical understanding of this phenomenon remains largely unexplored. In this project, the student will develop a theoretical/simulation-based model to explain the underlying mechanisms of laser ablation and to quantitatively estimate the amount of redeposited material. The simulated results will be benchmarked against published experimental observations. This work is expected to provide valuable insight into high-power laser–matter interaction and redeposition. Knowledge of Python or other programming languages is desirable.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.Sc. Physics

3) Academic Project duration:

(a) Total academic project duration: 16 Weeks

(b) Student's presence at IPR for academic project work: 2 Full working Days per week

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