

Enhancement of laser ablation with an external 9T pulsed magnetic field

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Pulsed laser deposition technology is a widely used method to manufacture thin film. A series of experiments conducted on the Magnetized Laser Plasma Device (MLPD) at USTC shows that external pulsed magnetic field could enhance the laser ablation markedly. In contrast to the conventional condition, Faraday Cup detectors show that the pulsed magnetic field improve the ion numbers by two orders relative to that without magnetic field, which is also confirmed by the deposited film thickness. Faraday Cup data also shows that the ion numbers are insensitive to the laser energy when adding pulsed magnetic field, while it is proportional to laser energy when without magnetic field. The temporal evolution of plasma profiles indicates that the enhanced laser ablation is caused by magnetic field confinement of laser plasma and re-heating by induced electric field of pulsed magnetic field.

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