

Laser-plasma interaction and target compression studies

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This paper reports the experimental results on the investigation of laser heating and compression of microspherical targets using our six-beam glass laser system. Irradiation experiments were generally performed with two of the six-beams. Laser power in each beam was typically 100 gigawatts and the pulse width 100 picoseconds. Two kinds of targets were used: $(\text{CD}_2)_n$ solid microspheres (~ 60 to $600 \mu\text{m}$ in diameter) and glass microballoons (~ 55 to $75 \mu\text{m}$ in diameter with ~ 0.55 to $0.75 \mu\text{m}$ thick walls) filled with neon or deuterium gas. In our experiments, various parameters of laser plasmas could be simultaneously measured by more than ten kinds of diagnostics for optical measurements, X-ray and particle emission studies. Preliminary physical results of target compression and laser nonlinear interaction with target corona have been presented.

激光等离子体相互作用和靶压缩研究

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本文报告利用我们的六路玻璃激光系统进行激光加热与压缩微球靶研究而得到的实验结果。辐照实验通常采用六路中的两束对打的方式,每束激光的功率约为0.1兆瓦,激光脉宽为100微微秒。实验中使用两种类型靶: $(\text{CD}_2)_n$ 实心微球(直径 $\sim 60-600 \mu\text{m}$)与充有氖气或氙气的玻璃球壳(直径 $\sim 55-75 \mu\text{m}$,壁厚 $\sim 0.55-0.75 \mu\text{m}$)。我们用了十多种测试手段,可以对靶等离子体进行光学、X光与粒子发射等各方面特性的诊断。文中给出了有关激光压缩与激光-靶冕非线性相互作用方面所得到的初步物理结果。