Dense Plasma Diagnostics with a Nomarski Interferometer Using a Frequency-tripled Ti:sapphire Laser

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The peak power output of femtosecond lasers is inherently limited by the size and damage threshold of the final grating in the chirped pulse amplification compressor which presents a significant bottleneck. To overcome this limitation, some research has been conducted to explore materials with higher damage tolerance, and one promising method is using the dispersion characteristics of plasma for laser pulse compression. In order to effectively utilize plasma for the pulse compression, it is crucial to diagnose the expansion dynamics of the plasma over time. In that reason, we employed a time-resolved Nomarski interferometer to measure side-view density profiles of a laser-induced aluminum plasma. Our experimental setup utilized a frequency tripled Ti:sapphire laser system, generating a probe pulse with a central wavelength of 266 nm. This measurement system will be employed for studying laser-aluminum target interactions in experiments exploring plasma-based laser pulse compression.

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