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Mass Distributions of Ions Extracted from a Target Cavity Confined Plasmas Produced by Nanosecond Laser Pulses

Characteristics of ions in the laser plasma depend mainly on laser parameters as well as the background environment. Confinement of the plume promotes collisions within the plasma. When the target is repeatedly ablated at the same region, the target forms a hole. When the plasma production is initiated in the deep cavity, the expansion of the plasma plume is effectively constrained. Ion species distributions of a cavity confined plasma is being investigated. A Q-switched Nd: YAG laser ablates a cylindrical graphite target 15 degrees from the surface normal axis. Ions are extracted by aluminum plates with a 9 mm aperture. The extracted ion beam trajectory is steered by a magnetic deflection analyzer along a target axis of a cylindrical graphite target. Ions are then characterized by a time-of-flight spectrometer. The target is rotated during ablation to form a deep cavity. Ion distributions are being characterized for varying laser power densities and target cavity depths.

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