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Iron Plasma Generation using Several Hundred Picoseconds of Nd:YAG Laser Pulse

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Laser ion sources have been developed for the purpose of generating high intensity heavy ion beams. We have produced high intensity laser plasma by using Nd:YAG laser with several nanoseconds of the laser pulse and successfully generated high intensity heavy ion beams by applying the direct plasma injection scheme. The capability of the source to generate high intensity and high charge state beams strongly depends on the power density of the laser irradiation. Therefore we focused on using higher power laser to generate higher charge state heavy ions. We irradiated an iron target with several hundred picoseconds of Nd:YAG laser pulse and produced Fe20+ ions. In case of the nanosecond laser with similar laser power, the highest charge state was Fe18+. In this presentation, the charge state distribution of the laser-produced iron plasma under a variety of irradiation condition is summarized.