Hot electron generation by using circular/linear polarized ultra-intense laser pulse applied for Fast Ignition

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Ultra intense laser plasma interaction can produce a hot electron flow by v x B force in a direction of laser propagation. By using a circular polarized ultra-intense laser pulse, we can push the hot electrons without oscillations those are involved in a linear polarization [1]. According to a simulation, these hot electrons have a mono-energetic distribution with energies around MeV [2]. This energy is suitable for fast ignition scheme where hot electrons should deposit its energy into a pre-compressed fuel with a total areal density of ~1 g/cm^2 [3].

We report experimental results of hot electron generation by tuning a polarization (circular/linear) of ultra-intense laser from a 500 mJ/100 fs hybrid lase system BEAT: optical parametric chirped pulse amplification and Ti-Sapphire multi-pass amplifier [4]. We irradiated ultra-intense laser with a focal intensity beyond 10^{18} W/cm^2 into a solid metal target. This experimental result might apply for Fast Ignition experiments conducted in Hamamatsu with counterbeam configuration [5,6,7].

References

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