Relativistic positron production with ultra-intense short-pulse lasers

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Ultra-intense laser interactions with solid foils are studied as a means to produce relativistic positron plasmas, which has been proposed as a potential laboratory for understanding positron-electron plasma aspects of gamma-ray bursts [1]. Initial experiments with high energy Nd:glass lasers have revealed a strong dependence of the positron yield, and energy distribution, on the thin-foil target thickness [2]. This arises from the contribution of so-called "trident" electro-production positrons, beyond the photo-production which dominates in thick targets [3]. Prospects for thin-target positron production and detection in 100 TW-class ultra-short pulse laser experiments will be presented.

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References

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