Three dimensional mathematical modeling of laser-initiated gamma source

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Different regimes of electron acceleration from low-density targets are investigated using three-dimensional numerical simulations. Multiple spatial target density profiles were examined, including laser prepulse modified targets. The size of the plasma corona is shown to be one of the main parameters characterizing the temperature and number of hot electrons, which determine the yield of gamma radiation and its hardness. The generation of gamma radiation by laser accelerated electrons, which impact the converter target located behind the laser target, was studied. The gamma spectra were computed using Monte-Carlo simulations.