Effective sources of gamma radiation under the action of relativistic electrons on combined target

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Bright X-ray and gamma-ray sources are needed in modern physical applications like radiography of ultrafast process in warm dens matter under action of intense energy fluxes, laboratory astrophysics, generation of photonuclear reactions and neutron beams.
We study the possible optimization of the yield N_{ph} of high energy bremstruhlang photons emitted while a bunch of electrons accelerated by powerful PW or sub-PW laser pulses in plasma of near-critical density (NCD) [1, 2] and passed through metallic rear part of combined target. The NCD plasma is created by action of ionizing nanosecond prepulse on the front part of the combined target consisting of aerogel (CHO) foam. The optimization consist of 2 parts: i) maximizing the charge $Q_{>E_n}$ of accelerated electron bunches for group of electrons with energies $E > E_n$ (E_n in MeV) using respective choice of parameters of powerfull laser pulses and plasma created in the aerogel foam. We show the possibility of achieving $Q_{>10} \simeq 1 \div 10^2$ mkCl. ii) maximizing N_{ph} in the considered range of quantum energies E_{ph} (we consider quants with 100 keV $< E_{ph} <$ 10 MeV) for given flux of high energy ($E \sim 1 \div 10^2$MeV) electrons using respective choice of parameters of metallic targets.

[1] Vladisavlevici I M, Vizman D and d'Humieres E 2022 *Photonics* **9**
[2] Rosmej O N, Gyrdymov M, Gunther M M, Andreev N E *et al.* 2020 *Plasma Physics and Controlled Fusion* **62** 115024