

# Intense laser sources of gamma radiation and neutrons based on high-current beams of super-ponderomotive electrons

Andreev N E<sup>1,2,®</sup>, Umarov I R<sup>1,2</sup> and Popov V S<sup>1</sup>

<sup>1</sup> Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow 125412, Russia

<sup>2</sup> Moscow Institute of Physics and Technology, Institutskiy Pereulok 9, Dolgoprudny, Moscow Region 141701, Russia

® andreev@ras.ru

Intense photon and neutron beams in the MeV energy range are an effective tool in many areas of research, such as diagnostics of matter in extreme states, nuclear physics and materials science, as well as in medical and biophysical applications. Intense beams of photons and neutrons in the MeV energy range are effective A concept is presented for creating efficient sources of gamma-radiation and neutrons, based on the generation of relativistic electrons in the direct laser acceleration mode during the interaction between a laser pulse with an intensity of  $10^{19}$  W/cm<sup>2</sup> and an extended plasma of the near-critical density [1, 2].

- [1] Günther M, Rosmej O, Tavana P, Gyrdymov M, Skobliakov A, Kantsyrev A, Zähler S, Borisenko N, Pukhov A and Andreev N 2022 *Nat. Commun.* **13** 170
- [2] Andreev N, Umarov I and Popov V 2023 *J. Surf. Invest.: X-Ray, Synchrotron Neutron Tech.* **17**