

# High energy particles and X-rays in relativistic laser-matter interaction

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Intense beams of photons and particles in the MeV energy range are effective tools in different areas of research, such as the creation and diagnostics of matter in extreme states, nuclear physics and in other applications. An efficient concept for creating sources of  $\gamma$ -radiation, positrons and neutrons based on the generation of relativistic electrons in the regime of direct laser acceleration is discussed. PW-class laser systems capable of generating subpicosecond and femtosecond pulses focused to ultrarelativistic intensity, are good candidates for creating high-current beams of ultrarelativistic electrons in an extended plasma with a density close to critical [1,2], which was confirmed in experiments [3,4].

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