

# Generation of high energy electrons and protons in interaction of relativistic laser pulse with foams of sub-mm thickness

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### Abstract

We report new results on acceleration of electrons and protons in interaction of relativistic laser pulses with foams, obtained in the experiment on the PHELIX facility in October - November 2021.

By varying the parameters of the ns-laser pulses used to ionize the foam, it was possible to register different regimes of acceleration of electrons and protons in "quasi-static NCD plasma" and in "strong expanding plasma". In first case, the electrons were accelerated up to 100 MeV and protons - up to 30 MeV at  $10^{19}$  W/cm<sup>2</sup> laser intensity. In second case, the achieved energies of electrons and protons were lower, but electron beam was stronger collimated than in first case. During the experiment, a new multi-Imaging Plate method was used for the reconstruction of the proton spectra.

As an application, the DLA electrons were used for the "Flash Effect" providing a record dose rate of 50 Gy/ps.

