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Laser driven plasma acceleration at PEARL laser system: progress and prospects.

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The work presents the experimental investigation of interaction between femtosecond sub-PW laser pulse with plasmas conducted at PEARL laser facility. The conditions of effective laser energy deposition into the solid target leading to TNSA proton beams with up to 43 MeV energy cut-off are experimentally realized. The characterization of the target conditions is achieved by combining X-ray spectrometry and proton spectra measurement. The ways to improve the maximal energy of the laser driven protons which are based on laser pulse contrast enhancement techniques are considered as well as application perspectives.

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