

Ion acceleration activities at ELI NP with the acceleration of more than 100 MeV protons

Thursday, 21 September 2023 11:30 (30 minutes)

Currently, the 10 PW experimental area is under commissioning with the first shot being fired on April 13. The experimental campaign started at the end of last year when the 10 PW laser beam was delivered to the interaction chamber with the short focal parabolic mirror. The laser is a Ti:sapphire system with a central wavelength of 810nm and a pulse duration of about 24fs. The best laser spot size achieved is 2.8 μ m at FWHM, with an encircled energy of about 50%, giving an effective laser peak intensity on target of about $6 \times 10^{22} \text{Wcm}^{-2}$. All high-power shots were performed via a single plasma mirror both to improve the laser temporal contrast and reduce the probability of back-reflected laser light. To commission the laser and the experimental area we have performed proton acceleration via the TNSA mechanism. Many diagnostics were implemented to gather a wide range of information to better understand the interaction of the laser with a solid target. Proton energies exceeding 100 MeV have been attained, even if the laser temporal contrast is still affected by a few pre-pulses mainly in the nanosecond regime.

In this talk, the preliminary results obtained with the 10 PW laser system will be presented.

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Session Classification: Plenary session

Track Classification: Invited