

TOF technique for laser-driven proton beam diagnostics for the ELIMED beamline

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Due to the non-conventional features of laser accelerated ion beams, the development of innovative diagnostics instrumentation is a key requirement to deliver suitable beams for different kind of multidisciplinary applications.

Thanks to the high radiation hardness, signal to noise-ratio and time resolution, diamond detectors, used in Time of Flight (TOF) configuration, have been chosen for energy spectrum and fluence measurement along the ELIMED transport beam line which will be realized by LNS-INFN and installed in 2017 at ELI-Beamlines facility (CZ).

The detectors have been already tested with laser-driven proton beams during many experimental campaigns, carried out with different kinds of lasers and target configurations.

For high-energy particle beams, the reconstruction of the correct impinging particle energy and the consequent extraction of proton fluence is crucial, and a dedicated study has been devoted to this purpose.

The critical points in the analysis procedure used to disentangle the laser-accelerated protons from the ion contribution and reconstruct the correspondent energy spectrum and fluence, in the different experimental campaigns will be presented in details.

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