

DESIGN AND STATUS OF THE ELIMED BEAM LINE FOR LASER-DRIVEN ION BEAMS

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Charged particle acceleration using ultra-intense and ultra-short laser pulses has gathered a strong interest in the scientific community and it is now one of the most attractive topics in the relativistic laser-plasma interaction research. Indeed, it could represent the future of particle acceleration and open new scenarios in multidisciplinary fields, in particular, medical applications. One of the biggest challenges consists of using, in a future perspective, high intensity laser-target interaction to generate high-energy ions for therapeutic purposes, eventually replacing the old paradigm of acceleration, characterized by huge and complex machines. The peculiarities of laser-driven beams led to develop new strategies and advanced techniques for transport, diagnostics and dosimetry of the accelerated particles, due to the wide energy spread, the angular divergence and the extremely intense pulses. In this framework, the realization of the ELIMED (ELI-Beamlines MEDical applications) beamline, developed by INFN-LNS (Catania, Italy) and installed in 2017 as a part of the ELIMAIA beamline at the ELI-Beamlines (Extreme Light Infrastructure Beamlines) facility in Prague, has the aim to investigate the feasibility of using laser-driven ion beams in multidisciplinary applications. ELIMED will represent the first user's open transport beam line where a controlled laser-driven ion beam will be used for multidisciplinary and medical studies. In this paper, an overview of the beamline, with a detailed description of the main transport elements, will be presented. Moreover, a description of the detectors dedicated to diagnostics and dosimetry will be reported, with some preliminary results obtained both with accelerator-driven and laser-driven beams.