

Design of the ELIMED in-vacuum transport beam-line

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Laser-target acceleration represents a very promising alternative to conventional accelerators for several potential applications, from the nuclear physics to the medical ones. However, some extreme features, not suitable for multidisciplinary applications, as the wide energy and angular spreads, characterize optically accelerated ion beams. Therefore, beyond the improvements at the laser-target interaction level, a lot of efforts have been recently devoted to the development of specific beam-transport devices in order to obtain controlled and reproducible output beams. In this framework, a three years contract has been signed between the INFN-LNS (IT) and Eli-Beamlines-IoP (CZ) to provide the design and the realization of a complete transport beam-line, named ELIMED, dedicated to the transport, diagnostics and dosimetry of laser-driven ion beams. The transport devices will be composed by a set of super-strong permanent magnet quadrupoles able to collect and focus laser driven ions up to 70MeV/u, and a magnetic chicane made of conventional electromagnetic dipoles to select particles within a narrow energy range. Here, the design and development of these magnetic systems is described.

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