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Laser driven ion beam for multidisciplinary applications at ELIMAIA beamline

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Nowadays, high power laser-driven acceleration is one of the most interesting challenges in particle acceleration field, showing attractive characteristics for multidisciplinary and medical applications. Nevertheless, optically accelerated ion peculiarities make mandatory development of transport, selection, diagnostics and dosimetry system to deliver reproducible and controlled beams for multidisciplinary purposes. This is the main purpose of the user-oriented ELIMAIA (ELI Multidisciplinary Applications of laser-Ion Acceleration) beamline that will be installed at the ELI-Beamlines facility in Czech Republic within 2018, where high-energy laser driven ions, up to 60 MeV/n, will be available for users.

In this contribution an overview of the ELIMAIA beamline development, with a description of the adopted solutions for transport elements, diagnostics and dosimetry devices will be presented.

Preliminary results on time of flight measurements of high-energy proton beam accelerated by the PW Vulcan laser at the RAL facility (UK), performed using high temporal resolution diamond detectors, will be discussed. Moreover, some results on relative and absolute dose measurements performed with transmission ionization chamber and Faraday cup using the high repetition rate laser system at LOA laser laboratory (France) will be also presented.

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