

Innovative dosimetry systems for high dose-rate per pulse laser-driven ion beams in the ELIMED beam line

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The growing interest towards multidisciplinary applications of laser-driven beams, has led to the development of the ELIMED (ELI-Beamlines MEDical and multidisciplinary applications) beamline, by INFN-LNS. ELIMED will be installed at the ELI-Beamlines facility in Prague. Laser-accelerated particles, differ from the conventional beams for the wide energy spread, the angular divergence, the intense pulses and particularly for the high dose-rate per pulse [1,2]. This last peculiarity implies to study and develop alternative dose-rate independent detectors for both relative and absolute dosimetry measurements. At this aim, the dosimetric system will consist of a Faraday Cup dedicated to the absolute dose measurement and of a secondary emission monitor (SEM) and a innovative multi-gap in-transmission ionization chamber (IC) for relative dosimetry. The IC is composed by two different gaps of increasing thickness, in order to correct for the recombination effects due to the extremely high dose rate per pulse. Fixing the voltage and the distance between the electrodes, the ratio of the currents in the different gaps only depend on the ionization charge density. Therefore, it is possible to determine shot by shot the collection efficiency of a gap thanks to the measurement of the efficiency ratio of the different gaps [3]. In this contribution, this new detector for relative dose measurements will be presented.

REFERENCE

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Primary author: Mr AMICO, ANTONIO GIUSEPPE (Università degli studi di Catania)

Presenter: Mr AMICO, ANTONIO GIUSEPPE (Università degli studi di Catania)

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