

Proton Beams Produced by Laser Interaction in Italy: from the First Experiences at the INFN FLAME Facility toward the Development of a Multidisciplinary Proton Beam Line (ELIMED)

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The first proton beam emitted by laser interaction in TNSA scheme was obtained in Italy in 2012. The experiment named LILIA (Light Ions Laser Induced Acceleration) was carried out at the laser FLAME facility at INFN in Frascati. Details about the laser and target set-up will be described along with the detectors used for the preliminary measurements.

In the frame of LILIA related activities we developed different diagnostic tools. At the same time a fully 3D simulation was performed in order to design a post acceleration scheme of laser induced beams, based on collimators, pulsed solenoids and high frequency linacs.

In 2013 within the objectives of the ELIMED experiment (MEDical applications at ELI-Beamlines) we started R&D activities for the development of a multidisciplinary proton beam line with laser accelerated protons.

The experiences gained both in LILIA and in ELIMED lead to the definition of a common program aimed to develop targets, diagnostic elements, PIC simulations, beam transport design for a 30 MeV beam line.

In the contribution the results obtained up to now and the future developments of the experiment will be presented.