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Mono-Energetic Ions emission by nanosecond laser solid target irradiation

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An experimental campaign aiming to investigate the acceleration mechanisms through Laser-matter interaction in nanosecond domain has been carried out at the LENS (Laser Energy for Nuclear Science) laboratory of INFN-LNS, Catania. Different techniques permit to monitor the plasma and to determine its reproducibility. Different targets of pure Al are placed in a vacuum chamber and innovative diagnostic systems, like Thomson Parabola (TP) spectrometer has been used. Targets were then irradiated by Nd:YAG 2J, 6 ns infrared laser ($\lambda=1064$ nm) at different pumping energies. Advanced diagnostics tools were used for characterizing the plasma plume and ion production: two IC (ion collectors) for time-of-flight measurements, an X-ray sensitive CCD camera for X-ray imaging and X-ray flux measurements and an ICCD-camera for time resolved optical imaging.

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