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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.

Primary author: Dr MUOIO, annamaria (Università di Messina - INFN LNS Catania)

Co-authors: Prof. TRIFIRÒ, Antonio (Università di Messina - INFN sezione di Catania Italy); Dr ALTANA, Carmen (Università di Catania - INFN LNS Catania Italy); Dr MASCALI, David (INFN LNS Catania Italy); Dr SCHILLACI, Francesco (INFN - LNS Catania Italy); Dr LANZALONE, Gaetano (Università "Kore" di Enna - INFN LNS Catania Italy); Dr CIRRONE, Giuseppe Antonio Pablo (INFN -LNS Catania Italy); Dr TUDISCO, Salvo (INFN-LNS Catania Italy)

Presenter: Dr MUOIO, annamaria (Università di Messina - INFN LNS Catania)

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