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Nanostructured targets for improved interaction in the high intensity laser experiments

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Nanostructured targets have a bigger surface area compared to flat targets, which are the usually employed materials in high intensity, high power laser-matter interaction experiments. This allows to improve the interaction by enabling a stronger coupling of the laser with the targets, leading to a volumetric heating and an enhanced particle acceleration. Nickel nanowires and nanotubes were prepared by electrochemical methods, with diameters of hundreds of nanometers and lengths of several micrometers. When interacting with a high intensity, femtosecond laser pulse, an enhancement in accelerated proton energy and signal of electrons and X-ray was measured experimentally, from the structured targets compared with the flat foils.

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