

## Spatial profile modulation of a proton beam generated by laser interacting with micro-structured targets

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The interaction of the laser system at LLC (Lund Laser Centre, 40 TW, 1020 W/cm<sup>2</sup>, 109 ns-contrast) with nano and micro structured thin (micrometer-scale) targets was systematically studied to control and to improve the main proton beam parameters.

Mylar foils covered with nano-spheres on their rear side (with respect to the laser-target absorption surface) allowed to modulate the spatial profile of the accelerated proton beams. Moreover the presence of the nano-spheres allowed to improve the proton beam spatial homogeneity.

Grating targets with different step dimensions influenced the divergence of the proton beam and drastically changed its shape through a sort of stretching effect.

Experimental results will be here shown and discussed with the support of 2D and 3D particle-in-cell simulations.

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