## Abstract Submitted for the DPP12 Meeting of The American Physical Society

Parametric study of ion acceleration in electrostatic shock waves ELISABETTA BOELLA, FREDERICO FIÚZA, ANNE STOCKEM, RICARDO FONSECA, LUIS SILVA, GoLP/Instituto de Plasmas e Fusão Nuclear - Laboratorio Associado, Instituto Superior Tecnico, Lisbon, Portugal — In past years, a considerable effort has been devoted to investigate the acceleration of ions by means of laser-plasma interactions. Recently, a new mechanism has been proposed to accelerate ions efficiently in laser-driven electrostatic shock waves. As experiments and numerical simulations demonstrated [1, 2], shocks with low Mach number can be generated in near critical density plasmas; such shocks are able to accelerate ions having an energy spectrum suitable for medical applications. We have developed a reduced electrostatic code [3] that captures all the relevant 1D physics of shock formation and particle acceleration; the code has been benchmarked with full-PIC OSIRIS calculations. In the poster, we will present results from a detailed parameter scan for different plasma temperature and density profiles inducing the shock formation; moreover, the optimal conditions for the generation of high energy and high quality ions beams will be illustrated.

- [1] D. Haberberger *et al.*, Nature Phys. **8**, 95 (2012)
- [2] F. Fiúza et al., submitted to Phys. Rev. Lett. (2012)
- [3] E. Boella *et al.*, Bull. Am. Phys. Soc. QRP1 (2011)

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