

Channeling 2018



Contribution ID: 41

Type: not specified

Carbon Ion and Proton Acceleration From Ultra-Thin Foils Employing Ultra-Short Laser Pulse

In this work, we present experimental results concerning the laser-driven ion acceleration obtained from the interaction of an ultra-short laser pulse with ultrathin carbon foils. In this interaction regime, laser polarization can play an important role in the ion acceleration, with circular polarization significantly reducing unwanted effects like electron heating and consequently improving the acceleration. Our results show a strong dependence of the maximum ion energies on laser polarisation, with circular polarisation leading to the highest energy values for both carbon ion and proton. This is consistent with the onset of Light Sail acceleration, also indicated by PIC simulations.

Primary author: Dr DORIA, Domenico (ELI-NP, HH-IFIN, QUB)

Co-authors: Dr MACCHI, A. (Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (CNR/INO), Laboratorio Adriano Gozzini, 56124 Pisa, Italy); Mr MCILVENNY, A. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Dr SGATTONI, A. (Ecole Polytechnique, UPMC, LESIA Paris France); Dr SCULLION, C. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Prof. NEELY, D. (Central Laser Facility, Rutherford Appleton Laboratory, Oxfordshire OX11 0QX, United Kingdom); Ms DITTER, E. (The John Adams Institute for Accelerator Science, Imperial College, London, SW7 2BZ, United Kingdom); Dr HICKS, G. (The John Adams Institute for Accelerator Science, Imperial College, London, SW7 2BZ, United Kingdom); Dr AHMED, H. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Dr ROMAGNANI, L. (LULI, École Polytechnique, CNRS, Route de Saclay, 91128 Palaiseau Cedex, France); Prof. BORGHESI, M. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Mr ETTLINGER, O. (The John Adams Institute for Accelerator Science, Imperial College, London, SW7 2BZ, United Kingdom); Mr MARTIN, P. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Prof. MCKENNA, P. (SUPA, Department of Physics, University of Strathclyde, Glasgow G4 0NG, United Kingdom); Dr KAR, S. (Centre for Plasma Physics, School of Mathematics and Physics, Queen's University Belfast, Belfast BT7 1NN, United Kingdom); Mr WILLIAMSON, S. (SUPA, Department of Physics, University of Strathclyde, Glasgow G4 0NG, United Kingdom); Prof. NAJMUDIN, Z. (The John Adams Institute for Accelerator Science, Imperial College, London, SW7 2BZ, United Kingdom)

Presenter: Dr DORIA, Domenico (ELI-NP, HH-IFIN, QUB)