

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Observation of spectral modulations in laser ion acceleration from underdense plasmas ALESSANDRO FLACCO, Laboratoire d'Optique Appliquée, Palaiseau, France, FRANÇOIS SYLLA, SUBHENDU KAHALY, MINA VELTCHEVA, GONZALO SANCHEZ-ARRIAGA, ERIK LEFEBVRE, VICTOR MALKA — Ions have been accelerated radially by irradiating a supersonic helium gas jet ($400\mu\text{m}$ diameter) with ultrashort, relativistic laser pulses ($I\lambda^2 > 10^{18}\text{Wcm}^{-2}\mu\text{m}^2$). Accelerated ions have been measured over a wide range of densities ($0.01n_c < n_e < 0.1n_c$). Strong modulations in the ion spectra have been observed, depending on the interaction conditions. Whereas Monte-Carlo particle tracking indicates recombination of ions accelerated by Coulomb explosion, due to charge exchange with neutral gas, detailed 2D1/2 PIC simulations suggest the trapping and acceleration of ions from plasma edges by radially propagating waves. These results evidence new insights on the laser gas interaction in this density range.

Alessandro Flacco
Laboratoire d Optique Appliquée, Palaiseau, France

Date submitted: 22 Jul 2010

Electronic form version 1.4