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Ion acceleration from near-critical density aerogel and foam targets R. LEON*, S.S. BULANOV, F. DOLLAR, L. WILLINGALE, V. CHVYKOV, G. KALINCHENKO, A.G.R. THOMAS, V. YANOVSKY, K. KRUSHELNICK, A. MAKSIMCHUK, CUOS, University of Michigan, J. DAVIS, G.M. PETROV, Naval Research Laboratory, W. NAZAROV, University of St.Andrews, UK — Interaction of an intense laser pulse with near-critical density plasma makes a channel both in electron and then in ion density. The propagation of a laser pulse through such a channel is connected with the acceleration of electrons in the wake of a laser pulse and generation of strong moving electric and magnetic fields in the propagation channel. Upon exiting the plasma the magnetic field generates a quasi-static electric field that accelerates and collimates ions from a thin filament formed in the propagation channel. Two-dimensional Particle-in-Cell simulations show that a 100 TW laser pulse tightly focused on a near-critical density target is able to accelerate protons up to an energy of 250 MeV [1]. We present the experimental results on ion acceleration from silica aerogel targets with density of 40-100 mg/cm^3 and CHO foam targets with density of 3-45 mg/cm^3 using 100 TW, 30 fs laser pulses focused to intensities of 10^{22} W/cm^2 at normal incidence. Detailed 2D-PIC computer modeling of these interactions will also be presented and compared to the experimental data. [1] S.S. Bulanov et al. PoP **17**, 043105 (2010). *Morehouse College

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