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Relativistic laser interactions with near-critical density plasmas L. WILLINGALE, K. KRUSHELNICK, A.G.R. THOMAS, F.J. DOLLAR, A. MAKSIMCHUK, C. ZULICK, University of Michigan, H. CHEN, A.U. HAZI, G.J. WILLIAMS, Lawrence Livermore National Laboratory, P.M. NILSON, R.S. CRAXTON, T.C. SANGTER, V. GLEBOV, C. STOECKL, LLE, University of Rochester, W. NAZAROV, University of St Andrews, J. COBBLE, Los Alamos National Laboratory, P.A. NORREYS, Rutherford Appleton Laboratory — The Omega EP laser facility (LLE) and the Titan laser (LLNL) provide relativistic laser pulses for experiments to reach the extreme conditions relevant to fast ignition. We perform fundamental studies using very low-density foam targets, to generate a near-critical density plasma. The interactions are characterized and we investigate particle acceleration and channeling phenomena. In particular, the electron heating is measured and is shown to have strong dependance on target density. The effects of the density dependance on the accelerated proton beam and optical radiation measured from the interaction will be presented and discussed. Two dimensional particle-in-cell simulations give good agreement to these phenomenon. This work was supported by the National Laser Users' Facility (NLUF), DOE (Grant No. DE-NA000874). Work performed by LLNL under the auspices of U.S. DOE under contract DE-AC52-07NA27344.

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