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Diagnosing ablator-fuel mix in NIF implosions using charged-particle spectrometry R. PETRASSO, A. ZYLSTRA, J. FRENJE, D. CASEY, M. GATU JOHNSON, C. LI, F.H. SEGUIN, H. RINDERKNECHT, M. ROSENBERG, MIT, R. BIONTA, O. LANDEN, A. MACKINNON, LLNL, J. KILKENNY, GA, C. SANGSTER, LLE — Achieving areal-density and temperature conditions necessary for hot-spot ignition at the National Ignition Facility (NIF) requires careful control of four key implosion parameters, which characterize the expected performance. These are implosion velocity, fuel adiabat, hot-spot shape and ablator-fuel mix. It has been shown that these four parameters can be combined into an ignition threshold factor (ITF) that is a good predictor of implosion yield. In this talk, we present a new technique for diagnosing the extent of ablator-fuel mix. This technique, which utilizes compact Wedge-Range-Filter (WRF) spectrometers routinely used on NIF, relies on spectral measurements of elastically-scattered deuterons from the fuel, which should not have escaped the implosion without the presence of mix. This work was supported in part by the U.S. DOE, LLNL and LLE.

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