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Diagnosing Inertial Confinement Fusion Implosions Using the D^{3}He Spectrum Line Width at OMEGA and the NIF A. ZYLSTRA, M. ROSENBERG, N. SINENIAN, C. LI, F. SEGUIN, J. FRENJE, R. PETRASSO, MIT, R. RYGG, D. HICKS, S. FRIEDRICH, O. LANDEN, A. MACKINNON, R. BIONTA, LLNL, J. KILKENNY, A. NIKROO, GA, V. GLEBOV, C. STOECKL, C. SANGSTER, P. MCKENTY, R. BETTI, LLE, R. OLSON, SNL, D. WILSON, LANL — Wedge Range Filter (WRF) spectrometers are used to measure the proton spectrum due to the D+^{3}He $\rightarrow$ p (14.7 MeV) + ^{4}He (3.6 MeV) reactions produced in implosions containing D and ^{3}He gas. The line width of the measured spectrum is due to the thermal Doppler broadening, instrumental broadening, and several capsule effects such as a finite source size and implosion asymmetries. Models for these broadening sources are presented. Using these models we calculate an ion temperature in OMEGA and NIF exploding pusher shots. This Doppler-derived temperature is compared to independent measurements. Alternatively we use this model to constrain the amplitude of high-mode ρR asymmetries in NIF indirect-drive CH shell implosions. This work was supported in part by the U.S. DoE, LLNL, LLE, FSC, and NLUF. A.Zylstra is supported by the DoE NNSA Stewardship Science Graduate Fellowship.

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