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**Results of Rayleigh-Taylor tantalum strength experiments at high pressure and high strain rates on NIF**[1] HYE-SOOK PARK, N. R. BARTON, C. M. HUNTINGTON, P. D. POWELL, S. PRISBREY, B. A. REMINGTON, R. E. RUDD, D. C. SWIFT, C. E. WEHRENBERG, A. ARSENLIS, J. M. MCNANEY, Lawrence Livermore Natl Lab — We are studying tantalum strength at high pressures (up to 8 Mbar), high strain rates (˜$10^7$ $s^{-1}$) and high strains (>30%) under ramped compression condition using Rayleigh-Taylor instability (RTI) properties. Understanding plastic deformation dynamics of materials under these extreme conditions is an area of research of high interest to a number of fields, including meteor impact dynamics and advanced inertial confinement fusion designs. We find that the RTI growth for materials in the solid state, compressed under high pressure and high strain rate conditions, is reduced compared to classical RT, which we assume is due to the material strength (effective lattice viscosity). Our results show that the measured growth factor follows the Livermore Multiscale strength Model (LMS) [2] closely and that the work hardening dominates in this regime. We will describe the experimental results from NIF in comparison with the various strength models. [1] H. –S. Park et al., Phys. Rev. Lett. 114, 065502 (2015). [2] N. Barton, et al., J. App. Physics, 109, 073501 (2011).

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