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Experimental Comparison of Tantalum Material Strength between Single Crystal [100] and [111] Samples at High Pressure and Strain Rates[1] CHRISTOPHER PLECHATY, HYE-SOOK PARK, ROB CAVALLO, ROBERT RUDD, SHON PRISBREY, BRIAN MADDOX, CHRISTOPHER WEHRENBERG, MARK MAY, BRUCE REMINGTON, Lawrence Livermore National Laboratory — Experiments were performed using the OMEGA laser to investigate the strength difference between single crystal [100] and [111] Ta samples at high pressure (1 Mbar), and high strain rates (10^6- 10^8 s^{-1}). To achieve these pressures and strain rates in experiment without melting the sample, a quasi-isentropic drive [1] was employed to drive the growth of pre-imposed sinusoidal perturbations on the surface of the Ta samples, via the Rayleigh-Taylor (RT) instability. By measuring the ripple amplitude using face-on high energy (∼22 KeV) radiography [2], the strength of the Ta sample is inferred from the amount of RT growth observed [1]. Under these experimental conditions, the Ta material strength can be modeled by the Multiscale (MS) model [3], developed at LLNL. The value of the "Taylor Factor" (a MS model parameter), is thought to vary for [100] and [111] crystal orientations. To investigate this difference under these conditions, a comparison of the ripple growth was performed on the two samples for the same shot and drive conditions. [1] Park, H.S., *et al.*, PRL **104**, 135504 (2010). [2] Barnes, J. F., *et al.*, JAP **45**, 727, (1974). [3] N. Barton *et al.*, JAP **109**, 073501 (2011).

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