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Absorption in Temporally Clean Ultra-Intense Laser Plasma Interactions CALVIN ZULICK, University of Michigan, FRANKLIN DOLLAR, University of Colorado, Boulder, ANTHONY RAYMOND, LOUISE WILLINGALE, VLADIMIR CHVYKOV, GALINA KALINTCHENKO, ANATOLY MAKSIMCHUK, ALEXANDER THOMAS, VICTOR YANOVSKY, KARL KRUSHELNICK, University of Michigan — Experiments at the HERCULES laser facility have been performed to measure the transmission and reflection of a temporally clean ultra-intense laser pulse interacting with a thin-film solid density target. The laser pulse had a nanosecond amplified spontaneous emission contrast of better than 10^{-15} which was achieved through a combination of cross polarized wave (XPW) pulse cleaning at the pre-amplification level as well as the use of dual plasma mirrors. Silicon based targets ranging in thickness from 10's of nanometers to millimeters demonstrated $\leq$ 1% light transmission. Target reflectivity of up to 70% was observed with S polarization, and up to 30% with P polarization. An increase in target absorption was observed with thin-film targets which has been attributed to the deformation of the target critical surface. OSIRIS simulations have been performed to model the thin-film interactions, and have been compared to experimental results.

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