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Direct drive target designs for laser fusion energy[1] ANDREW J. SCHMITT, J.W. BATES, D.E. FYFE, S.P. OBENSCHAIN, S.T. ZALESAK, Naval Research Laboratory, M. QUIGLEY, SAIC, R. BETTI, FSC & LLE, Univ. Rochester — We discuss the development of high-gain directly-driven targets for energy applications. We have simulated, in 1D and 2D, implosions of both conventional and shock-ignition targets in the low energy regime (<1MJ). All designs take advantage of efficient energy coupling and higher pressures available with $0.248\mu m$ wavelength KrF light and zooming of the focal spot. We find significantly higher yields with shock ignition: gains near 100x at 0.3 MJ and over 200x at 1 MJ. Both conventional and shock ignited targets are fairly robust to achievable outer and inner surface finishes and inner ice surfaces. Rayleigh-Taylor (RT) instabilities are controlled with adiabat tailoring and low-aspect ratio targets. We assess risks and sensitivities due to hydro instabilities, laser-plasma instabilities, beam pointing and power balance, and the higher convergence ratios of these smaller targets.

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