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High Gain High Efficiency Heavy-Ion Direct Drive Targets L.J. PERKINS, J. BARNARD, LLNL, B.G. LOGAN, LBNL, M. HAY, UC Berkeley — New simulations of heavy ion (HI) direct drive fusion targets indicate that fusion gains of 50-80 may be achievable with less than 0.5MJ of heavy-ion drive energy. The inherently high efficiency of HI direct drive (15-20% incident beam energy to shell kinetic energy) permit very simple all-DT targets with thick, low aspect ratio (A=2) shells that should exhibit high ablative R-T stabilization with robust in-flight stability characteristics. Beam symmetry studies show that 60 beams may suffice with rotated beam spots on the ablator. Present work is directed to obtaining target gain curves (i.e., target fusion energy gain versus HI drive energy), optimum HI pulse shapes in both ion kinetic energy and intensity, hydrodynamic stability, and the prospects of driving such targets with two-sided beam geometry as opposed to conventional 4-pi spherical symmetry that would permit simplified, more attractive target chamber geometries. Application to small heavy ion fusion test reactors with 10's MW average fusion powers, and to small fission fusion hybrids will be addressed. (Work performed by LLNL under Contract DE-AC52-07NA27344 on behalf of the Heavy Ion Fusion Virtual National Laboratory)

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