Shock Ignition in Non-Cryogenic Metal-Gas Targets on the National Ignition Facility\textsuperscript{1} L. JOHN PERKINS, C. CERJAN, V. SMALYUK, D. BAILEY, LLNL, A. COMLEY, W. GARBETT, AWE Aldermaston, P. MCKENTY, LLE U. Rochester, B. CHENG, LANL — Shock ignition offers the possibility of volumetric ignition and burn in single-shell, room-temperature gas targets on the National Ignition Facility. We are investigating whether the high fusion energy gains potentially available with shock ignition in cryogenic DT targets on NIF (L.J.Perkins et al, PRL 103 (2009)) can be traded for modest gains and yields in such platforms. If so, being non-cryogenic with simple single-shell construction and medium-pressure gas fill, they should easier to field and diagnose. The targets are characterized by a thick, graded-density Be-Au ablator-pusher shell with low in-flight-aspect-ratios. Because the high-Z Au shell reflects Bremsstrahlung, such targets are capable of volumetric ignition at temperatures of around 4keV with low shell velocities around 1.5e7cm/s. Gas targets are inherently low gain (\leq 10) so they are probably not IFE relevant. The ultimate performance will be determined by degree and control of high-Z mix in the gas. Simulations indicate that we can potentially trade fusion yield for good ignition fall-line behavior by tuning gas pressure and shock launch time.

\textsuperscript{1}This work performed under the auspices of U.S. DOE by LLNL under Contract DE-AC52-07NA27344.