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**Assessing the prospects for achieving double-shell ignition on the National Ignition Facility using vacuum hohlraums<sup>1</sup>**  
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The goal of demonstrating ignition on the National Ignition Facility (NIF) has motivated a revisit of double-shell (DS) [1] targets as a complementary path to the baseline cryogenic single-shell approach [2]. Benefits of DS targets include room-temperature deuterium-tritium (DT) fuel preparation, minimal hohlraum-plasma-mediated laser backscatter, low threshold-ignition temperatures (4 keV) for relaxed hohlraum x-ray flux asymmetry tolerances [3], and loose shock timing requirements. On the other hand, DS ignition presents several challenges, including room-temperature containment of high-pressure DT (790 atm) in the inner shell; strict concentricity requirements on the two shells; development of nanoporous, low-density, metallic foams for structural support of the inner shell and hydrodynamic instability mitigation; and effective control of perturbation growth on the high-Atwood number interface between the DT fuel and the high-Z inner shell. Recent progress in DS ignition target designs using vacuum hohlraums is described, offering the potential for low levels of laser backscatter from stimulated Raman and Brillouin processes. In addition, vacuum hohlraums have the operational advantages of room temperature fielding and fabrication simplicity, as well as benefiting from extensive benchmarking on the Nova and Omega laser facilities. As an alternative to standard cylindrical hohlraums, a rugby-shaped geometry is also introduced that may provide energetics and symmetry tuning benefits for more robust DS designs with yields exceeding 10 MJ for 2 MJ of 3w laser energy. The recent progress in hohlraum designs and required advanced materials development are scheduled to culminate in a prototype demonstration of a NIF-scale ignition-ready DS in 2007.

[1] P. Amendt et al., PoP 9, 2221 (2002).

[2] J.D. Lindl et al., PoP 11, 339 (2004).

[3] M.N. Chizhkov et al., Laser Part. Beams 23, 261 (2005).

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