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Current Scaling Studies with the Z Accelerator MICHAEL G. MAZARAKIS, MIKE E. CUNEO, HENRY C. HARJES, WILLIAM A. STYGAR, DANIEL B. SINARS, CHRISTOPHER DEENEY, EDUARDO WAISMAN, THOMAS J. NASH, KENNETH W. STRUVE, DILLON H. MCDANIEL, Sandia National Laboratories — The dependence of the peak radiated x-ray power and total radiated energy on the load current is presently under investigation with the Z accelerator in a new experimental campaign. Two load currents, peaking at 16-MA and 13-MA, are utilized. The load masses are lighter than usual and equal approximately to 2.5mg for the higher current and 1.1mg for the lower current. The arrays are of 20mm diameter and 10mm height with 300 tungsten wires. The 16-MA shots give peak powers of up to 190 TW, the highest ever obtained with single 20-mm tungsten arrays. The implosion times are shorter, 80 ns versus 95 ns for the heavier loads; however the peak powers are much higher. The improved performance of the lighter arrays could be attributed to shorter ablation times and less mass left behind. Our up-to-date results demonstrate that faster implosions are better and most attractive for ICF applications where high peak powers are of paramount importance. Hence future high current Z-pinch drivers with shorter rise times may be preferable if the cost remains reasonable. Results will be presented and compared with analytical theory predictions. *Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the USDOE's National Nuclear Security Administration under Contract DE AC04-94AL85000.

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