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Expansion of Single Wires with Enlarged Diameters at the Electrical Contacts. CLAYTON MEYERS, DAVID CHALENSKI, SHAAN QAMAR, PETER SCHRAFEL, BRUCE KUSSE, Cornell University, LABORATORY OF PLASMA STUDIES TEAM — The energies deposited before voltage collapse in single wires have been measured comparing straight, uniform diameter wires with wires that have enlarged diameters at the electrode contacts. The single wires were driven by our XP-Pulser that produced 5 kA pulses with risetimes of 10^4 A/s and can drive single wires through the voltage collapse. Tungsten wires with an initial diameter of 50 μm were etched down to 25 μm over a 1.9 cm length. Diffraction techniques were used to measure the diameter of the etched wires along their length and to center the 25 μm section between the electrodes that were placed 2 cm apart. The energy deposition in these etched wires were compared to that deposited in 50 μm wires that were etched to 25 μm over their entire length and wires that started out with a 25 mm diameter. In all cases these wires passed through 0.013 inch holes in the electrodes, large compared to the diameters of the wires. In general the results showed that more energy was deposited in the wires with large diameters at the electrode ends than in the uniform diameter wires. This research was supported by DOE grant DE-FG03-98ER54496, by Sandia National Laboratories contract AO258, and by the NNSA Stockpile Stewardship Academic Alliances program under DOE Cooperative Agreement DE-FC03-02NA00057.

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