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Bounds for Kinetic Energy and Resistance for W wire array implosions on Z EDUARDO WAISMAN, MICHAEL CUNEO, DANIEL SINARS, WILLIAM STYGAR, RAYMOND LEMKE, Sandia National Laboratories — Electrical and radiation data are analyzed for wire array z-pinches on the Z machine.The measured stack voltage and MITL current are employed to obtain the voltage at the Z vacuum convolute, and from it and the measured load current an upper bound for the wire array load inductance is constructed. Energy conservation is then employed to obtain the kinetic energy a few ns before stagnation, by observing that knowledge of the load inductance upper bound and the load current provide an upper bound for the magnetic energy downstream of the vacuum convolute, and that the internal energy is negligible at that time. An approximate lower bound for the pinch resistance is obtained at a time when the radiated X-ray power has decreased to a half of its peak value by assuming that at this point the pinch kinetic energy is negligible and by estimating the internal energy of the tungsten plasma from its apparent size and radiated power. Several single W wire array shots are analyzed using this technique. By further assuming that after the end of the ablation phase the pinch breaks up in two thin shells of prescribed mass their paths, as well as the current split between the two, are obtained self-consistently thereafter. Comparisons of the kinetic energy bound with results of 3D RMHD calculations for selected shots are provided. Insights gained by this data analysis are presented.

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