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Zero-dimensional implosion models for the Nested and Planar Wire Arrays ANDREY ESAULOV, University of Nevada, Reno, ALEXANDER VELIKOVICH, Naval Research Laboratory, TOM MEHLHORN, MIKE CUNEO, Sandia National Laboratories — In order to maximize power of the plasma radiation sources produced by the implosions of wire arrays the array implosion time should perfectly match the shape and duration of the current pulse. The most effective and reliable tool used so far for optimization of cylindrical array loads is so-called 0D model, which neglects plasma ablation from wires. To apply this model to more complex wire array configurations, such as cylindrical and planar arrays, one has to couple self-consistently the equation of wire motion in the global magnetic field with an algorithm of calculation of the inductive division of current between the wires. The resultant generalized 0D model allows fast calculations of the array implosion time and the amount of the energy coupled with plasma due to the motional impedance, and can be used for the optimization of the nested and planar wire array loads, including the control of Z-pinch radiation performance. This model also reveals some interesting features of the implosion dynamics of nested and planar arrays due to the effect of the current transfer. Detailed study of these features in conjunction with 3D MHD modeling is very important for the improvement of Z-pinch stability.

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