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WITHDRAWN - Dynamics of Precursor Coronal Plasmas and Wire Ablation in Wire Array Z-Pinches[1] B.V. OLIVER, ATK-Mission Research, E.P. YU, T.A. MEHLHORN, Sandia National Laboratories, P. SASOROV, ITEP, RU — The radial acceleration of low density (relative to the wire core) coronal plasmas, towards the axis of wire-array Z pinches, is observed in a variety of experiments on various pulsed-power accelerators [S. V. Lebedev, et al., Phys. Rev. Lett. 85, 98 (2000); V.V. Aleksandrov, et al., Fizika Plazmy 27, 99 (2001); M.E. Cuneo, et al., Bull. Am. Phys. Soc. 43, 234 (2001)]. The dynamics of these coronal plasmas play an important role in the distribution of both current and mass prior to the run in phase of the full array. An extension of previously reported 1-D theory of coronal plasma dynamics to include two dimensional effects and the role of the core state in the plasma production/ablation process is presented. The plasma production rate can be determined either by electron thermal and or radiation conduction from the coronal plasma to the wire core. In either case electron thermal conduction is necessary. For very high current parameter regimes (e.g. > 20 MA), details of the core state need to be considered in the analysis. Two dimensional considerations suggest a weak scaling of ablation rate with the ratio of wire core diameter to inter-wire gap and suggest that strong two-dimensional effects reduce the production rate. It is concluded that to accurately model wire ablation, the material properties of both the ablated plasma and the wire core need to be determined.

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