$$\alpha = -\sigma_1 \cdot L_1(u_1)/\lambda_c F^{(1)}(u_1,u_1) \quad (\bar{u} = u_1) \tag{39}$$

$$X = T_1^{(0)*}\chi^{(1)} + T_{12}^{(0)*}\psi^{(1)} + T_1^{(1)}\chi^{(0)*} + T_{12}^{(1)}\psi^{(0)*} \tag{42a}$$

$$Y = T_2^{(0)*}\psi^{(1)} + T_{12}^{(0)*}\chi^{(1)} + T_2^{(1)}\psi^{(0)*} + T_{12}^{(1)}\chi^{(0)*} \tag{42b}$$

$$\alpha = \mu/\lambda_c F^{(1)}(u_1,u_1) \tag{45}$$

With these corrections, the discussion of general imperfections given at the end of the paper remains valid. Equations (44) then give an imperfection shape proportional to the buckling mode only in the special case of a prebuckling state characterized by equal constant normal stress resultants and identically zero shear-stress resultant and rotations.

As a further observation, it is noted that the equations giving the postbuckling coefficients a, b, ... [Eqs. (22) of the subject paper] are, in fact, the compatibility conditions for the equations giving the functions u_2, u_3, ..., respectively. Thus, the equation for a is obtained by setting $\delta u = u_1$ in Eq. (13c) and $\delta u = u_2$ in Eq. (8c), and subtracting the results. Similarly, b is obtained by setting $\delta u = u_1$ in Eq. (14c) and $\delta u = u_3$ in Eq. (8c) and subtracting the results. This derivation of the postbuckling coefficients is more direct than the derivation given in the paper.

Comments on "Acceleration Process in a Stabilized High-Current Arc"

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In a recent Note, Burton and Chang[1] report on current sheet dynamics in a pulsed parallel plate accelerator with and without electrode insulation. In this paper, they state that previous work did not investigate the effect of electrode insulation on acceleration process, but the author[2] has reported similar experiments in an inverse pinch with and without insulated electrodes. This is difficult to understand because Ref. 2 was also included as a reference in the paper by Burton and Chang.[1]

In view of their overlooking this work with insulated electrodes, the author would like to compare the work of Burton and Chang[1] with that reported in Ref. 2. In these experiments in an inverse pinch, the electrode was a tungsten button approximately one inch in diameter with pyrex or quartz disks as the "insulating electrodes." Current sheet behavior in this system is described in detail in Ref. 3, but a very brief summary is given here emphasizing the aspects that were significantly different from those observed by Burton and Chang.[1]

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In the experiments in the inverse pinch,[3] the current sheet was found to be completely stable and to propagate in a relatively thin uniform sheet. There was very little tilt of the current sheet and no diffuse areas near the electrodes were observed. In fact, insulating electrodes were used specifically to remove the usual diffuse region near the electrode and current sheet tilt. The reasons that the insulating electrodes achieve this are discussed in Ref. 2. In addition, under no conditions were the propagation of current vortices, reported in Ref. 1, observed.

As discussed by Burton and Chang,[1] there is good reason to believe that ablated material from the electrodes and insulators greatly affect the current sheet pattern. The work in the inverse pinch was primarily a study of the production of strong shock waves and thus great care was used to achieve a clean experiment. This is evidenced by the use of aluminum oxide, pyrex, and quartz as insulating materials, and tungsten as electrodes in the entire experiment. However, in Ref. 1 the insulator was nylon and the electrodes were brass, both of which can yield a much greater amount of impurities. It is the author's belief that the possibility of increased impurities in the experiments of Burton and Chang[1] could have produced the difference in data observed between their experiments and those reported in Ref. 2.

References

[1] Burton, R. L. and Chang, O. Y., "Acceleration Process in a Stabilized High-Current Arc," *AIAA Journal*, Vol. 6, No. 11, Nov. 1968, pp. 2190–2192.

[2] Sorrell, F. Y., Ph.D. thesis, 1966, California Institute of Technology, Pasadena, Calif.

[3] Sorrell, F. Y., "Current Sheet Dynamics in an Inverse Pinch," *The Physics of Fluids*, Vol. 11, No. 5, May 1968, pp. 993–1001.

Reply by Authors to F. Y. Sorrell

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We are fully aware that F. Y. Sorrell has performed and reported experiments in an inverse pinch with insulated electrodes, and did not intend to give the impression that his work was overlooked. We are not sure why the current sheet in his insulated inverse pinch propagates in snowplow fashion, whereas the current sheet in our insulated parallel plate has a zero velocity and a grossly steady magnetic field pattern. Sorrell comments on the possibility of impurities in our experiment. Indeed, as mentioned in the Note, it is our belief that our arc runs entirely on vaporized electrode material.

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