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CORRIGENDUM

Nonlinear theory of the Weibel instability

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by Don S. Lemons, S. Peter Gary
Los Alamos Scientific Laboratory, University of California, Los Alamos, NM 87545
and D. Winske
Department of Physics and Astronomy, University of Maryland,
College Park, Maryland 20742

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It has been called to our attention that our paper on the nonlinear evolution of a temperature anisotropic plasma ($T_\perp > T_\parallel$) in the absence of an external magnetic field (Lemons, Winske & Gary 1979) did not make reference to several relevant and previously published works. Specifically, the linear theory of this unstable plasma has been explored by Kalman, Montes & Quemada (1968), the quasi-linear theory by Smith (1969) and Montes, Coste & Diener (1970) while additional thermodynamic considerations were given by Montes & Peyraud (1972). We regret this oversight.

The work most comparable with our own is that of Montes and co-workers (1970, 1972): (1) both make use of thermodynamic arguments; (2) both model the evolution of the unstable plasma with a quasi-static or adiabatic process; and (3) both depend on a constraint in addition to conservation of energy. Important differences between the two works are: (1) the earlier papers are valid only to second order in the wave magnetic field and the temperature anisotropy (ϵ where $\epsilon = 1-T_\parallel/T_\perp$) while our work is valid to all orders in these parameters; (2) Montes *et al.* assume that the plasma maintains a bi-Maxwellian velocity distribution while we explain the use of a drifting bi-Maxwellian for which the drift is proportional to the wave magnetic field and ϵ; and (3) we assume that most of the magnetic field energy is in one wave mode while Montes *et al.* make no such assumption. A comparison of Smith's paper (1969) with that of Montes *et al.* (1970) is made in Appendix D of the latter.

Many of the theoretical results of our paper are similar to those of the earlier work (cf. expressions for the maximum magnetic field energy density, equation (68) in Montes *et al.* (1970) and equation (23) in Lemons *et al.* 1979) although they are not in exact agreement even to second order in ϵ. The major advances our work makes are in generalizing and making more consistent the earlier theory, and in comparing theoretical results with results from a computer simulation of the Weibel instability. The latter advance requires the former since numerical constraints usually dictate the use of large temperature anisotropies in simulations.

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