Abstract Submitted
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Buneman-Hartree Condition Revisted[1] D.H. SIMON, Y.Y. LAU, R.M. GILGENBACH, University of Michigan, W. TANG, B. HOFF, K.L. CARTWRIGHT, Air Force Research Lab, J.W. LUGINSLAND, Air Force Office of Scientific Research — The Buneman-Hartree (B-H) condition is re-examined in a cylindrical relativistic magnetron using both the conventional, single particle model, and the Brillouin flow model. These two models yield the same result for the B-H condition only in the limit of a planar magnetron. When $b/a = 1.3$, where a is the cathode radius and b ($> a$) is the anode radius, the difference in the two models becomes significant. When $b/a = 4$, the difference is acute, the B-H magnetic field, at a given voltage, in the Brillouin flow model exceeds four times that in the single particle model. Such a difference is always present, whether the voltage is relativistic or not. These results are quantified for $b/a >> 1$ using Davidson's model [1], conveniently cast in terms of the normalized gap voltage and normalized magnetic flux imposed on the cylindrical magnetron [2]. Comparison with experiments will be reported.

[1] R. C. Davidson *et al.*, Proc. SPIE **1061**, 186 (1989).
[2] Y. Y. Lau *et al.*, Phys. Plasmas **17**, 033102 (2010).

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