Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Buneman-Hartree Condition Re-Visited Y.Y. LAU, W. TANG, B. HOFF, R. GILGENBACH, University of Michigan - Ann Arbor, J. LUGINSLAND, NumerEx, K. CARTWRIGHT, Air Force Reserach Laboratory, NUMEREX COLLABORATION, AIR FORCE RESEARCH LABORATORY COLLABORATION
— The Buneman-Hartree condition (BHC) is re-examined in a cylindrical, smooth-bore, relativistic magnetron using both the conventional, single particle model, and the Brillouin flow model. These two models yield the same result for the BHC 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 BHC for the two models is significant. When b/a = 4, this difference becomes unexpectedly large. Such a difference is always present, whether the gap 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. This work is supported by AFOSR, AFRL, L-3, and Northrop-Grumman.

[1] R. C. Davidson, Prco. SPIE 1061, p. 186 (1989).

Wilkin Tang
University of Michigan

Date submitted: 17 Jul 2009 Electronic form version 1.4