Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

RF Modes in the Saturated Stage of a Magnetron[1] D.J. KAUP, University of Central Florida — Theoretical studies of the cold-fluid model of crossed-field electron vacuum devices such as magnetrons and crossed-field amplifiers have shown that there are two important stages to their operation [1]. First there is the "initiation stage" wherein an instability in the rf fields grows. When this instability saturates, the device enters into the "saturation stage." In this stage, there are the two slow modes from the initiaion stage, and three additional fast modes. One of these fast modes is the drift (diocotron) resonance. The other two modes are cyclotron modes. Whence the equations for this system is a fifth order set of ODE's. Theory [1] has outlined the major features of the drift resonance in the saturation stage. However a complete understanding of it and the contributions of the cyclotron modes require a study of numerical solutions. In the saturation stage there are five rf modes; the original two modes of the initiation stage and three additional fast modes with fast vertical oscillations on the order of 100-1000 times that of the initiation rf modes. We will present numerical solutions of these rf modes in the saturation stage, discuss their implications and how these solutions differ from those of the initiation stage.
[1] D.J. Kaup, Phys. Plasmas **13**, 053113 (2006).

[1]Research supported in part by the AFOSR.

D.J. Kaup
University of Central Florida

Date submitted: 23 Jul 2007 Electronic form version 1.4