Abstract Submitted
for the DPP00 Meeting of
The American Physical Society

Sorting Category: 8.1.0 (Theoretical)

Solar-Wind Magnetosphere Ionosphere System[1] W. HORTON, R. WEIGEL, IFS, U. Texas, Austin, J.C. SPROTT, U. Wisconsin, Madison — The solar wind driven magnetosphere-ionosphere exhibits a variety of dynamical states including low-level steady plasma convection, episodic releases of geotail stored plasma energy into the ionospheric known broadly as substorms, and states of continuous strong unloading identified as magnetic storms[2]. The WINDMI model is a six-dimensional substorm model that captures through a set of ordinary differential equations the energy flow through the solar wind-magnetosphere-ionosphere system. There are six major energy components of the system with conservation of energy and charge described by the coupling coefficients. We show when the $d = 6$ model can be reduced to the minimal $d = 3$ model for deterministic chaos. The reduced model is of the class chaotic circuit equations given in Sprott [3]. The bifurcation diagram remains similar and the limited prediction time is preserved (3hr). Determining all three Lyapunov exponents for the $d = 3$ model also allows us to determine the correlation dimension of the chaotic attractor for the system.

[1]Supported by NSF Grant 9907637.
[2]J.P.Smith, J.-L.Thiffeault, W.Horton, J. G. R., **105**, 12983 (2000).
[3]J.C.Sprott, Phys. Lett. A, **266**, 19 (2000).

Wendell Horton
horton@physics.utexas.edu
IFS, U. Texas, Austin

☐ Prefer Oral Session
☒ Prefer Poster Session

Date submitted: July 11, 2000 Electronic form version 1.4