

Abstract Submitted  
for the DPP10 Meeting of  
The American Physical Society

**Experimental verification of dynamics modulation in a periodically-driven neon glow discharge plasma** P.M. MILLER, M.E. KOEPKE, West Virginia University, H. GUNELL, Belgian Institute for Space Aeronomy — Two ionization wave modes in a driven neon glow discharge alternate as the dominant mode as their response to the driving force alternates between spatiotemporal and temporal periodic pulling. This phenomenon, termed *dynamics modulation*, was first noted by Koepke, Weltmann, and Selcher [1], who saw two limited but representative cases and proposed a mechanism [2] by which it occurs. Dynamics modulation is reproduced experimentally in a neon glow discharge plasma. The system is periodically driven near a non-dominant mode using a narrow-band ring dye laser tuned to a wavelength near the metastable neon transition at 588.35 nm. A spatially-fixed photodiode with a narrow band filter that selectively passes the primary neon spectral line at 640 nm is used to acquire the time series of luminosity oscillations. These experimental data are used to verify the proposed mechanism and explore the resulting implications for spontaneous unidirectional mode transitions that occur with a change in discharge current.

[1] M. E. Koepke, K.-D. Weltmann, and C. A. Selcher, Bull. Am. Phys. Soc. **40**, 1716 (1995).

[2] K. -D. Weltmann, M. E. Koepke, and C. A. Selcher, Phys. Rev. E **62**, 2773, (2000).

P. M. Miller  
West Virginia University

Date submitted: 23 Jul 2010

Electronic form version 1.4