Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Transitions in Ionospheric Turbulence from Farley-Buneman to Drift Gradient Regimes E. HASSAN, W. HORTON, S.K. LITT, A. SMOLYAKOV, Univ. of Saskatchewan, Saskatoon, Canada, S. BENKADDA, Univ. of Provence, Marseille, France, UNIVERSITY OF TEXAS AT AUSTIN, AUSTIN, TX, USA COLLABORATION[1], UNIV. OF SASKATCHEWAN, SASKATOON, CANADA COLLABORATION, UNIV. OF PROVENCE, MARSEILLE, FRANCE COLLABORATION — A unified set of nonlinear partial differential equations for the Farley-Buneman and Drift-Gradient ionospheric turbulence are derived and solved numerically. The new model allows one to understand and compute the transition from the Type I regime, where the ion acoustic waves dominate, to the Type II regime where the EXB drift velocity is below the sound speed and the vertical electron density gradient drives the turbulence. In the unified systems of equations there is strong mode-coupling between the two types of dynamics. Simulations show both the large scale rising of the low density bubbles and the anomalous resistivity and electron heating from the driven ion acoustic fluctuations.

[1]Univ. of Provence, Marseille, France

Wendell Horton
Space and Geophysics Laboratory, University of Texas at Austin

Date submitted: 06 Jul 2011 Electronic form version 1.4