

Abstract Submitted  
for the DPP14 Meeting of  
The American Physical Society

**Rossby-Khantadze Electromagnetic Planetary Waves Driven by Sheared Zonal Winds in the E-Layer Ionosphere** S. FUTATANI, LMFA-CNRS, Ecole Centrale de Lyon, Universite de Lyon, Ecully, France, W. HORTON, The University of Texas at Austin, L.Z. KAHLON, Physics Department, Government College University, Lahore 54000, Pakistan, T. KALADZE, I. Vekua Institute of Applied Mathematics, Tbilisi State University, 0186 Tbilisi, Georgia — Nonlinear simulations are carried out for planetary scale [ $> 1000\text{km}$ ] electromagnetic Rossby and Khantadze planetary waves in the presence of a sheared zonal flow in the weakly ionized ionospheric E-layer. A variety of sheared flow profiles are studied. We shown that the nonlinear dynamics with the sheared zonal flows provides an energy source into the vortex structures. The energy transfer through the Reynolds stress tensor produces growth of the stable vortices under a variety of conditions. The energy accumulation breaks the vortex structure into multiple species according to the non-uniformity of profile of the external zonal shear flows. S. Futatani, W. Horton, T. D. Kaladze, Phys. Plasmas 20, 102903 (2013). T. D. Kaladze, L. Z. Kahlon, W. Horton, O Pokhotelov, and O. Onishenchenko, Shear flow driven Rossby-Khantadze electromagnetic planetary vortices in the ionospheric E-Layer, EPL, 106, A05302 (2014). doi: 10.1209/0295-5075/106/29001

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Date submitted: 03 Jul 2014

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