Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Compressional Mode ULF Waves Excitation and Relativistic Electron Acceleration during a Geomagnetic Storm Event XI SHAO, L.C. TAN, A.S. SHARMA, University of Maryland, College Park, S.F. FUNG, Goddard Space Flight Center, NASA, USA, MATTIAS TORNQUIST, DIMITRIS VASSILIADIS, West Virginia University — There has been increasing evidence indicating the importance of magnetospheric ULF waves in the Pc-5 frequency range in enhancing relativistic electron fluxes in the outer radiation belt. These ULF waves can be divided into two groups: poloidal modes and toroidal modes. In theory, electron acceleration by poloidal-mode wave should be more effective than by toroidal mode wave due to that electron drift motion is mainly along the azimuthal direction overlapping with compressional (poloidal) mode wave electric field. We found evidence of relativistic electron acceleration by the compressional-mode ULF waves during a storm sudden commencement event on September 25, 2001. In this event, the energetic electron flux measured by LANL shows modulations of low-energy electrons and acceleration of high-energy electrons by the compressional mode electric field oscillations over 2-3 hours. The energy threshold of accelerated electrons at the geosynchronous orbit agrees well with the theory of drift-resonant interaction of magnetospheric electrons with compressional-mode ULF waves. Global MHD simulation of the event through NASA/CCMC will also be presented.

Xi Shao
University of Maryland, College Park

Date submitted: 19 Jul 2012 Electronic form version 1.4