Seminar Talk

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Friday, April 22, 2016
3:00 p.m. KH 224

Title: SABER NO+(v) Volume Emission Rates and its application to the IRI storm model development

Abstract:
Observations of thermospheric infrared 4.3 um limb emission from the TIMED/SABER instrument have fostered the development of new data products, models, and analysis tools for the study of upper atmospheric and ionospheric response to solar-geomagnetic disturbances. Enhancements in nighttime 4.3 um emission during storm periods are due to vibrational excitation of NO+ (i.e., NO+(v)), caused by auroral dosing and subsequent ion-neutral chemical reactions followed by radiative emission at 4.3 um. The fundamental observation-based quantity used to study the E-region from SABER 4.3 um emission measurements is the NO+(v) volume emission rate (VER). In this talk, we show the versatility of the NO+(v) VER, useful for characterizing the morphology of the E-region electron density as a response to magnetic disturbances. The end-goal of this study is to develop an empirical E-region storm-time correction to the International Reference Ionosphere (IRI) model. The IRI model is a widely used empirical model for the specification of ionospheric parameters and is recommended for the international use by the Committee on Space Research (COSPAR) and the International Union of Radio Science (URSI). However, the specification of the ionospheric response to solar-geomagnetic disturbances in IRI remains largely incomplete, and there is currently no storm-time correction to IRI parameters in the E-region.

Bio:

Dr. Fernandez is currently an adjunct professor in the Department of Physics, Computer Science and Engineering at Christopher Newport University. Also he is an adjunct professor in the Department of Electrical Engineering at Old Dominion University. Prior to join CNU and ODU, he was a Post-doctoral associate at the NASA Langley Research Center in Hampton. He holds a PhD in Electrical Engineering from the University of Nebraska-Lincoln. His research and academic activities include electromagnetism, radar systems, and satellite observations of the ionosphere.