FIRST TOMOGRAPHIC IMAGING OF EQUATORIAL IONOSPHERIC PLASMA BUBBLES

Kamalabadi Farzad, Joseph Comberiate, Larry Paxton, Paul Bernhardt, Gary Bust
University of Illinos at Urbana-Champaign, 1308 W Main St, Urbanan, United States.

Abstract:

Depletions in the ionospheric electron density caused by plasma turbulence in the nighttime equatorial ionosphere referred to as Equatorial Spread-F\'\' remain distressingly elusive despite several decades of observation, modeling, and theory. In this work, we present the first tomographic imaging of such plumes of plasma troughs from space with recent FUV measurements of atomic oxygen recombination at 135.6 nm from the Global Ultraviolet Imager (GUVI) onboard the TIMED satellite. Furthermore, ongoing efforts toward radio-tomographic imaging of plasma bubbles with a dense array of receivers in South America will be described in anticipation for the upcoming C/NOFS and COSMIC missions. Finally, inverse-theoretical issues and approaches associated with these tomographic imaging systems will be discussed. Such global analyses based on UV and radio measurements provide insight toward understanding bubble formation patterns and consequently to a more accurate characterization of the mechanisms responsible for the generation and evolution of these plasma instabilities.