

Technical Page

Proposal Type: Regular
 General Category: Terrestrial Aeronomy
 Observation Category: Sporadic-E
 Total Time Requested: 144 Hours

Proposal Title: In Search of the Causes of Coherent Radar Scatter from Sporadic-*E* Layers
ABSTRACT:

The purpose of the dual-beam incoherent scatter measurements proposed herein is to provide focused characterizations of the ionospheric conditions resulting in VHF coherent radar scatter from the *E*-region. The coherent radar support will be provided by the Cornell University Portable Radar Interferometer (CUPRI) system located near Isabela, PR. Observations from a number of campaigns in the Caribbean and elsewhere have found a variety of echo formats, from thin, relatively stationary layers, to discontinuous or quasi-periodic bursts of high intensity backscatter. A number of theories have been suggested in the recent literature, including:

- Proposals for large distortions in the electron density profiles to overcome the shorting effects across thin layers within an inclined magnetic field [*Woodman et al.*, 1991; and *Tsunodo et al.*, 1994, 1998].
- A non-local model showing there is indeed a regime of unstable scale sizes within thin, undistorted, layers [*Rosado-Roman*, 1999].
- Evidence for driving plasma irregularities with large neutral wind shears [*Larsen et al.*, 2000].
- Suggestions that quasi-periodic events may simply result from the normal downward transport of ionization [*Urbina et al.*, 2000].

Since knowledge of the details of the electron density profiles and the horizontal extents of density patches are the key to furthering our understanding of sporadic-*E*, these theories can be tested by the proposed series of measurements.

| Name | Institution | E-mail | Phone | Student |
|------------------|--------------------|--------------------|--------------|---------|
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I might want to do remote observing.

Instrument Setup

430 CH radar

Atmospheric Optical Instruments:

Ionosonde Lidar

Description of Observer Equipment: CUPRI radar.

Cornell All-Sky Imager, or equivalent.

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

425-435

46.7-47.2 for CUPRI

This proposal requires coordination with AFTWF within the band 425-435 MHz.