

Technical Page

Proposal Type: Large
 General Category: Terrestrial Aeronomy
 Sub-Category: Radar
 Observation Category: Exosphere
 Total Time Requested: 528 Hours

Proposal Title: A characterization of energetic neutral atoms in thermosphere/ionosphere/exosphere coupling

ABSTRACT:

This project investigates non-thermal populations of neutral hydrogen and oxygen atoms that influence ion-neutral coupling between the thermosphere, ionosphere, and exosphere. Simultaneous optical and radar observations of the coupled regions are proposed to pursue the following primary scientific goals: (1) to evaluate an apparent correlation between charge-exchange induced perturbations in H velocity distributions and the H+ abundance and flow in the topside ionosphere; (2) to quantify a potential non-thermal component of O and resolve inferred discrepancies in ion-neutral heat balance; and (3) to characterize the response of H and H+ to magnetic storms. Project by-products include the continuation of an initiative to quantify long term changes in H abundance due to global climate change as well as an assessment of current ISR analysis techniques that neglect the presence of hot O+. This initiative leverages significant improvements to both the incoherent scatter radar and passive optical capabilities currently underway at Arecibo Observatory, providing an unprecedented opportunity to resolve persistent uncertainties in our understanding of ion-neutral coupling mechanisms.

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Service Observing Request

- None
- All of the observing run.
- Part of the observing run.
- Queue Observing

Remote Observing Request

- No
- Maybe
- Yes

Instrument Setup

430 CH receiver 430 CH radar

Atmospheric Observation Instruments:

Tilt-Photometer Fabry-Perot

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned