Proposal Identification No.: T2318

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Technical Page

Proposal Type: Regular
General Category: Terrestrial Aeronomy
Sub-Category: Radar
Observation Category: Ionosphere
Total Time Requested: 80 Hours
Minimum Useful Time: 5 hours

Proposal Title: Multi-diagnoses of processes leading to ionospheric plasma line enhancement

ABSTRACT:

Based on Arecibo experiments carried out in late December of 2005 and early January of 2006, we have found possible processes leading to two types of plasma line enhancement. These processes were caused by 40.75 kHz whistler modes, originating from Naval transmitter located in Puerto Rico. Direct interactions of 40.75 kHz whistlers with ionospheric plasmas can excite lower hybrid waves to accelerate electrons and, subsequently, yield enhanced plasma lines with rather broad frequency spectra. In contrast, whistler waves propagating from the ionosphere into magnetosphere will interact and precipitate trapped energetic electrons from the inner radiation belts into the lower ionosphere, generating enhanced plasma lines with relatively narrow frequency spectra. As outlined in the attached proposal, several students have developed thesis research plans for further experimental and theoretical investigation of these intriguing phenomena. For optimum optical diagnoses, it is highly desirable to conduct experiments during the new moon period.

<table>
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<tr>
<th>Name</th>
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<tbody>
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Remote Observing Request

X Observer will travel to AO

Remote Observing

In Absentia (instructions to operator)

Instrument Setup

430 CH radar

Atmospheric Observation Instruments:

Fabry-Perot Ionosonde Lidar

Description of Observer Equipment: MIT All Sky Imaging System and VLF/LF Receiving System.
Special Equipment or setup: None

RFI Considerations

Frequency Ranges Planned