

## Technical Page

Proposal Type: Regular  
 General Category: Terrestrial Aeronomy  
 Sub-Category: Radar  
 Observation Category: Thermosphere  
 Total Time Requested: 288 Hours

**Proposal Title:** A Proposal for Radar Meteor Observations during the Seasonal Minimum of the Sporadic Activity at Arecibo: A Crucial Need for the Confirmation of Modeled Predictions and its Relation to the Atmospheric Ca, Ca+ and K Layers

*ABSTRACT:*

We request observing time with the 430 MHz radar before, during and after the spring solstice operated in high resolution meteor detection mode. These observations will be used to address several scientific and engineering projects with the involvement of three graduate students. Preliminary results from a recently started modeling effort predict a seasonal minimum of the diurnal micrometeor rate over Arecibo during this period. This prediction is supported by early meteor observations which showed that the meteor rates observed during the night of March 25, 2002 is at least 2 times lower than any other month during the same year (Janches and Chau, 2005; Janches et al., 2005). The observations proposed here will confirm the theoretical predictions providing the necessary data to understand and model the Micrometeor Input Function (MIF) in the Mesosphere/Lower Thermosphere (MLT) region. Understanding accurately the MIF is required to completely account for the sources of meteoric material in the upper atmosphere which is responsible for the formation of metallic layers observed by lidars. We also propose simultaneous lidar observations to investigate the relationship between the MIF and the Ca and Ca+ layers. These layers are characterized by two unique properties: 1) A very significant lack of Ca in the atmosphere, when compared with meteorite composition; and b) the ratio Ca+/Ca is much higher (by about 1 order of magnitude) than the corresponding ratios that have been measured for other meteoric metals found in the upper atmosphere.. We believe this behavior is directly connected to the observed high velocity micrometeor flux, since Ca is amongst the most refractory of the meteoritic constituents. We will complement these simultaneous observations with the K lidar. The proposed simultaneous campaigns will continue an ongoing observational program at the observatory (Tepley et al., 2003; Raizada et al., 2004). The data produced by these observations will also be used for a statistical study of sporadic E layers and to finalize the testing and the full characterization of the digital receiver for the 430 MHz radar.

Name	Institution	E-mail	Phone	Student
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**Service Observing Request**

**Remote Observing Request**

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

- No
- Maybe
- Yes

**Instrument Setup**

430 CH receiver 430 CH radar

**Atmospheric Observation Instruments:**

Lidar

**Special Equipment or setup:** none

**RFI Considerations**

**Frequency Ranges Planned**