

## Technical Page

Proposal Type: Regular  
 General Category: Terrestrial Aeronomy  
 Sub-Category: Radar  
 Observation Category: E-region  
 Total Time Requested: 24 Hours  
 Minimum Useful Time:

**Proposal Title:** Measuring the Effect of Ion-Neutral Collisions on E-Region ISR Observations Using the BGK, Brownian, and Hard-Sphere Approximations

*ABSTRACT:*

The collisional process that governs ion-neutral collisions in the partially ionized E-region plasma is unknown. However, the three most likely approximations for these interactions are: BGK, Brownian, and Hard-Sphere. Recent work has shown that it should be possible to measure the differences in the observed autocorrelations due to the effects of these ion-neutral collision approximations using the 430MHz transmitter at Arecibo. We request a diurnal observing period using the 430MHz transmitter with power profiles. This will allow us to diagnose the data quality of a new observing mode, using coded long pulse and pulse-to-pulse techniques, during both sunlit and dark periods. This 24-hour period will also provide data for a comparison of how, when, and at what altitudes the various collisional approximations yield similar results. Or more importantly, at what times and altitudes the approximations diverge and data quality degrades when compared to previous simulations.

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### Remote Observing Request

- Observer will travel to AO
- Remote Observing
- In Absentia (instructions to operator)

### Instrument Setup

430 CH receiver    430 CH radar

### Atmospheric Observation Instruments:

Ionosonde

**Special Equipment or setup:** Currently a new observing mode must be implemented using existing observing modes that incorporate both a coded long pulse (CLP) and pulse-to-pulse technique. This effort is being developed by Phil Perillat and Micheal Sulzer currently and will be ready before the February deadline.

## **RFI Considerations**

## **Frequency Ranges Planned**