

## Technical Page

Proposal Type: Urgent  
 General Category: Terrestrial Aeronomy  
 Sub-Category: Radar  
 Observation Category: Thermosphere  
 Total Time Requested: 42 hours Hours

**Proposal Title:** Improved Neutral atomic Oxygen density Estimation Using The Arecibo Dual-Beam ISR

*ABSTRACT:*

Neutral atomic oxygen density is a fundamental state parameter of the thermosphere, but its accurate measurement in the region has long been a difficult aeronomic problem. The recent development of a novel ground-based parametric approach to oxygen density estimation by Waldrop et al. (2006) offers a promising means to provide these needed estimates between 500-900 km. The technique exploits the charge exchange coupling between H+ and O and between O+ and H in the upper thermopshere and topside ionosphere, where oxygen density is derived as the parametric solution to the H+ continuity equation using Arecibo ISR measurements of the ion parameters. Although preliminary results strongly motivate the continued application of the continuity balance (CB) technique, they also reveal aspects of the technique that require further refinement. A key issue is the potential bias introduced by the neglect of horizontal components of H+ flux divergence, which cannot be measured using the standard single-beam topside mode at Arecibo. The primary goal of the proposed project is to use the new dual-beam radar system to measure this term, quantify its contribution to H+ continuity balance, and evaluate the error in CB estimation of neutral atomic oxygen density when this term is neglected.

Name	Institution	E-mail	Phone	Student
Lara Waldrop		lwaldrop@uiuc.edu		no

**Service Observing Request**

**Remot e Observing Request**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> None<br><input type="checkbox"/> All of the observing run.<br><input type="checkbox"/> Part of the observing run.<br><input type="checkbox"/> Queue Observing | <input checked="" type="checkbox"/> No<br><input type="checkbox"/> Maybe<br><input type="checkbox"/> Yes |
|---|--|

**Instrument Setup**

430 G                      430 CH receiver    430 CH radar

**Atmospheric Observation Instruments:**

**Special Equipment or setup:** none

**RFI Considerations**

**Frequency Ranges Planned**