

Technical Page

Proposal Type: Large
 General Category: Terrestrial Aeronomy
 Sub-Category: Radar
 Observation Category: Thermosphere
 Total Time Requested: 528 hours Hours
 Minimum Useful Time: 3 hours

Proposal Title: The Burnside Factor Revisited: A Model-Independent Ion Momentum Balance Study

ABSTRACT:

Studies of momentum exchange between the thermosphere and ionosphere have been used for decades to infer discrepancies between observation and theory in terms of the Burnside factor F . The lack of independent information regarding O density, however, introduces an ambiguity regarding the physical meaning of this “correction” factor: while it is usually intended to constrain theoretical estimates of the $O^+ - O$ momentum transfer cross section $Q_{O^+ - O}$, it could also reflect systematic bias in the (historically required) model specification of O density. We propose to incorporate O density and T_∞ values, derived empirically as solutions to the H^+ continuity balance equation, into the O^+ momentum balance equation to determine F and thus $Q_{O^+ - O}$. The project will use incoherent scatter measurements of the F-region and topside ionosphere in conjunction with passive optical observations of thermospheric winds (O 630.0 nm emission) and neutral H density (H 656.3 nm emission). This result has the potential to increase the accuracy of both future experimental studies – such as momentum or energy balance derivation of thermospheric density and temperature – as well as model calculations of thermospheric energetics or dynamics.

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Remote Observing Request

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

Instrument Setup

430 G 430 CH receiver 430 CH radar

Atmospheric Observation Instruments:

Tilt-Photometer Fabry-Perot

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned