# 2018 Workshop: Light Atoms Across Atmospheric Regions

Long title
Light Atoms Across Atmospheric Regions
Conveners
S. Nossal
L. Qian
Description

Light atoms play key roles in determining the dynamics and composition of the middle and upper atmosphere, as well as for the ionosphere and plasmasphere through charge exchange reactions. Neutral hydrogen is a by-product of methane and water vapor below, two principal gases involved in the radiative balance of the Earth's atmosphere. We invite presentations relating to modeling and observational studies of light atoms (H, O, He) in and/or across any of the atmospheric regions. There will also be time for informal discussion.

Agenda

Jeff Thayer – Mass density dependency on He/O ratio

Liying Qian– Temporal Variability of Atomic Hydrogen From the Mesopause to the Upper Thermosphere

Gonzalo Cucho-Padin - Tomographic Estimation of Exospheric Hydrogen Densities Distributions

Maggie Gallant – Model-Data Comparisons of Geocoronal H-alpha Emission Intensity

Alan Burns – Mechanisms related to hydrogen variability

Phil Richards – A Case for Higher H Concentrations

Andréa Hughes – Variations in Martian Proton Aurora as observed by MAVEN/IUVS

Susan Nossal – Hydrogen emission observations over multiple solar cycles

Justification

Knowledge of light atoms is important to understanding processes shaping the neutral atmosphere and the ionosphere and plasmasphere. This workshop contributes to the following CEDAR plan strategic thrusts:  Strategic Thrust #1:Encourage and Undertake a Systems Perspective to Geospace Strategic Thrust #2: Explore Exchange Processes at Boundaries and Transitions Strategic Thrust #3: Explore Processes Related to Geospace Evolution Strategic Thrust #4: Develop Observational and Instrumentation Strategies for Geospace System Studies

Summary

Light atoms and their respective ions [O, H, He, O+, H+, He+] play key roles in determining the dynamics and composition of the middle and upper atmosphere and ionosphere. The workshop included discussion of a range of both modeling and observational studies of variability of light atoms and their coupling across atmospheric regions and with the plasmasphere. The presentations spanned the Earth's mesosphere through 12 Earth radii. There was also a presentation about proton aurora on Mars. These studies draw on a variety of techniques including numerical and empirical modeling, optical remote sensing, radar observations, and tomography. A list of presentations is below, several of which were given by students.

Jeff Thayer – Mass density dependency on He/O ratio

Liying Qian– Temporal Variability of Atomic Hydrogen From the Mesopause to the Upper Thermosphere

Linda Hunt – SABER hydrogen data update

Gonzalo Cucho-Padin - Tomographic Estimation of Exospheric Hydrogen Densities Distributions

Maggie Gallant – Model-Data Comparisons of Geocoronal H-alpha Emission Intensity

Alan Burns – Mechanisms related to hydrogen variability

Phil Richards – A Case for Higher H Concentrations

Andréa Hughes – Variations in Martian Proton Aurora as observed by MAVEN/IUVS

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