

# 2021 Workshop: Lidar Science and Engineering

Long title

Lidar Science & Engineering Advances

Conveners

Jintai Li

Richard Collins

Titus Yuan

Description

The workshop conveners invite new contributions of lidar-based observations and techniques that advance our understanding of the atmosphere and geospace environments. These include developments of lidar instrumentation and techniques, observational strategies and synergies with other instruments and data sets, and approaches to understanding regional and global processes. The workshop provides an opportunity for researchers to present recent progress, discuss their priorities, and develop new initiatives. The format of the workshop will be short presentations that inform the attendees about current progress and new opportunities in lidar science and engineering. There will be short time for questions at the end of each presentation, and time for open discussion at the end of the session.

Agenda

Xinzhao Chu, University of Colorado Boulder, **High-Detection-Sensitivity Lidars for New Science Discoveries: What Questions are Raised?**

Jan Froh, Leibniz-Institute of Atmospheric Physics (IAP), **VAHCOLI: A general purpose Doppler lidar network for the middle atmosphere**

Michael Strotkamp, Fraunhofer Institute for Laser Technology, **Rugged, Versatile Diode-Pumped Alexandrite Lasers for Doppler Resonance Lidars**

Richard Collins, University of Alaska Fairbanks, **Establishing an Iron Resonance Wind-Temperature Lidar at HAARP for Active Studies of Polar Aeronomy**

Bifford Williams, GATS Inc., **Airborne Rayleigh and Sodium Lidars for the CGWaveS campaign**

Titus Yuan, Utah State University, **3-D imaging of Na layer by an ICCD imager and Na lidar**

Shikha Raizada, University of Central Florida, **A new methodology to infer peak volume emission rate of the green line using sodium resonance lidar**

Gary Swenson, University of Illinois at Urbana-Champaign, **A Na density method to measure turbulence to 105 km with Na lidar, with results from the ALO, and a discussion of 2 kzz zones**

## Justification

Lidar measurements continue to provide unique and important high-resolution measurements that advance CEDAR science. Lidar systems around the globe are making key measurements to advance our understanding of the role of multi-scale processes in the general circulation, how meteorological processes contribute to space weather, and ion-neutral coupling in the middle and upper atmosphere. Lidar systems extend the scope of our understanding of atmospheric processes and phenomena through deployment as part of coordinated multi-instrument experiments, as part of regional and global satellite observations and reanalyses, and providing benchmark data for modeling and theoretical studies.

The workshop supports the thrusts of the CEDAR strategic plan: Strategic Thrust #1: Encourage and Undertake a Systems Perspective to Geospace Strategic Thrust #2: Explore Exchange Processes at Interfaces and Boundaries Strategic Thrust #3: Explore Processes Related to Geospace Evolution Strategic Thrust #4: Develop Observational and Instrumentation Strategies for Geospace System Studies. Strategic Thrust #5: Fuse the Knowledge Base across Disciplines, Strategic Thrust #6: Manage, Mine, and Manipulate Geoscience Data and Models

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