

## **2015 Workshop: HAARP and CEDAR**

Long title

HAARP Application to CEDAR Science

Conveners

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Description

The High-frequency Active Auroral Research Program (HAARP) facilities located in Gakona, Alaska, include the world's most powerful and flexible ionospheric modification facility. It consists of a large aperture fully steerable phased array system with sophisticated modulation capabilities that can transmit over a frequency range from 2.8 MHz to 10 MHz at a power of 3.6 MW, giving an effective radiated power that is an order of magnitude higher than any previous comparable facility. Ownership of the HAARP facility is being transferred from the US Air Force to the University of Alaska Fairbanks (UAF), which means that this significant resource for active ionospheric modification experiments will now be under the direction of the university space physics research community, and its capabilities can be used to address the fundamental physical processes of interest to CEDAR scientists.

Ionospheric modification experiments have tremendous potential for informing our investigation of the ITM region. HF heating along with a suite of diagnostic instruments enable creation of conditions in space to determine ionospheric parameters in isolation, rather than having to infer them from observation of natural phenomena in which many processes may couple, requiring that researchers assume the values of some parameters in order to isolate and determine the quantities of interest. HF Heating experiments can provide well-resolved, high-fidelity measurements. Observations of the response to heating and subsequent return to equilibrium provide insights that are difficult to obtain through observations of natural phenomena. Many promising techniques have been developed and their potential can now be realized because of the power and

flexibility of the HAARP facility.

This workshop will address the opportunities created by the transition of HAARP to the university research community. Presentations will address experiment techniques for determining fundamental ionospheric and thermospheric parameters and how they can be used in CEDAR science. Invited talks will address the basics of ionospheric modification and how it can be used for aeronomy.

Justification

Quantifying small-scale ionosphere-thermosphere and magnetosphere-ionosphere coupling processes and how they contribute to determining the large-scale state of geospace

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