

Space Physics Seminar

Thursday, October 1, 2015

Controlled Study of Whistler Wave Propagation and Interactions with Space Plasmas at Arecibo, Puerto Rico

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Abstract:

We report our VLF whistler wave injection experiments, which have been conducted at Arecibo Observatory in the past 25 years, starting with the joint US-USSR Active Space Plasma Program experiment on December 24, 1989. In this experiment a satellite-borne VLF transmitter injected radio waves at the frequency and power of 10 kHz and 10 kW. A series of controlled whistler wave experiments with Arecibo HF heater were subsequently carried out during 1990 - 1998. In these ionospheric HF heating experiments, 28.5 kHz whistler waves were launched from the nearby Naval transmitter (code-named NAU) located at Aguadilla, Puerto Rico. HF heater waves were used to create ionospheric ducts (in the form of parallel-plate waveguides) to facilitate the entering of NAU whistler waves from the neutral atmosphere into the ionosphere. Conjugate whistler wave propagation experiments were conducted between Arecibo, Puerto Rico and Trelew, Argentina in 1997. In the next 15 years or so (1999 - ongoing), we conducted whistler wave experiments in the absence of an HF heater. Naturally-occurring large-scale ionospheric irregularities (due to spread F or TIDs) were relied on to guide NAU launched 40.75 kHz whistler waves to propagate from the ionosphere further into the radiation belts. We plan to use the newly built Arecibo HF heater and NAU VLF transmitter together with Arecibo UHF and microwave radars for further study of whistler wave interactions with space plasma.

3:30 pm

Refreshments
CAS Room 500

4:00 pm

Seminar
CAS Room 502

Next Week

- Joe Beaupre
Boston University
- BU Rocket Propulsion
Group



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