ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

ΤΜΗΜΑ ΦΥΣΙΚΗΣ

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday 15 November 2007
17:00-18:00

3rd Floor Seminar Room

"Studies of Ionospheric Sporadic E Layers at Midlatitude"

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Abstract

The Sporadic *E* layers constitute an integral part of the midlatitude *E* region ionosphere. They are thin layers of metallic ions which form at times in the altitude range between 95 and 115 km where ion motion is controlled by collisions while electrons are strongly "magnetized". Under certain conditions, sporadic *E* can be subject to plasma instabilities that sustain short-scale plasma waves which can scatter coherently HF and VHF radio waves. The last few years several experiments were made in Crete to study unstable sporadic E layers and related phenomena, by using VHF single and dual frequency continuous wave Doppler radars, radio wave interferometry techniques, vertical ionospheric sounders, and an all sky airglow imager. Also, observations were made from South France with an HF radar having large azimuthal coverage. As well, studies were undertaken to investigate the formation and dynamics of sporadic E layers and understand their long-term variability.

This colloquium will provide background material on the medium properties and some basic physical processes involved, followed by an informative tour on the ionospheric research activities, the experimental techniques used and the observations made in Crete the last years. Finally, a few findings will be discussed in some detail. These include the unexpected detection in the midlatitude ionosphere of the Farley-Buneman instability and its implications, a newly discovered relation between sporadic *E* layers and planetary waves, and finally refer to an explanation for a long standing question regarding the seasonal dependence of sporadic E.

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