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国台学术报告 NAOC COLLOQUIUM

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Time: Wednesday 2:30 PM, Apr.19th Location: A601 NAOC

Microwave Diagnostics of Pitch-Angle Anisotropy of

Electrons Accelerated in Solar Flares

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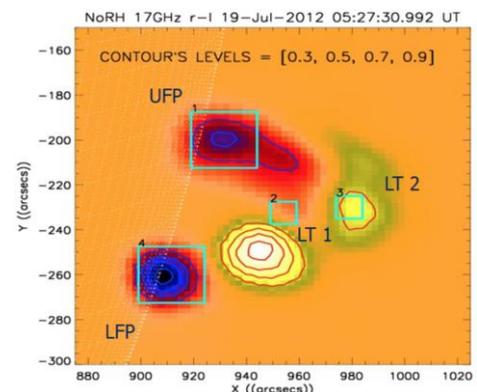
Prof. Victor Melnikov received his PhD (1990) and Dr.Sci.(2006) degrees from the Radiophysical Research Institute, Nizhny Novgorod, Russia where he worked as a leading scientist of the Solar Radio Astronomy Department. In 2008, he joined the Pulkovo Astronomical Observatory of Russian Academy of Sciences, Saint Petersburg, as a principal scientist. During his research carrier, he worked also as a visiting professor at universities and observatories of USA, UK, Japan, China and Brazil. His research interests are in the field of solar

flare physics and solar radio astronomy including radio and X-ray emission mechanisms, electron acceleration and transport in solar flares.

Abstract

Sun, due to its proximity to the Earth, is an excellent space laboratory which allows us to study very fundamental problems of space and astrophysical plasmas. Among these problems is the problem of particle acceleration. Very high energy electrons and protons are accelerated everywhere in the Universe: at galactic nuclei, supernovae, pulsars, stars of the main sequence including the Sun, etc. A number of theories and models are developed to explain physics of those accelerations.

Nevertheless, their applications to specific events are still ambiguous. In order to verify the theories, we need detailed and reliable observations. The knowledge about these processes can be obtained through observations of the electromagnetic emissions of the high energy electrons from their acceleration sites. It seems that in the near future we will get such detailed observations of, at least, solar flares. In my talk, I will show that modern radio observations with high spatial, spectral and temporal resolutions (MUSER, SRH, EOVS) may provide a breakthrough by putting important new constraints on mechanisms of electron acceleration in solar flares. The fact is that different acceleration mechanisms produce different types of the electron pitch-angle distributions. The key point here is a new possibility to determine the pitch-angle distribution in specific flaring magnetic loops through the mentioned detailed observations. This possibility is based on the recently found property of the gyrosynchrotron radio emission mechanism: significant influence of the pitch-angle anisotropy of radiating electrons on the high frequency slope of the microwave spectrum, on polarization, and other characteristics of their gyrosynchrotron radiation.



All are welcome! Tea, coffee, biscuits will be served at 2:15 PM.