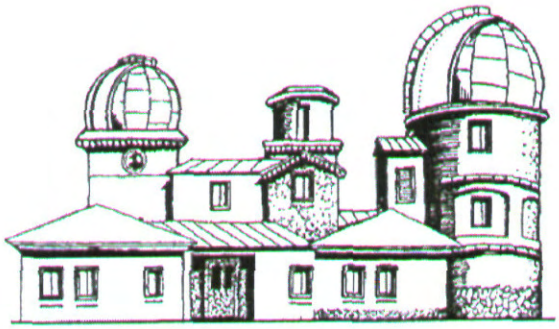
23. SLNEČNÝ SEMINÁR

Liptovský Mikuláš, 30. mája – 3. júna 2016

Slovenská ústredná hvezdáreň
v Hurbanove



Slnečná sekcia

Slovenská Astronomická Spoločnosť
pri Slovenskej akadémii vied

Slovak Central Observatory
in Hurbanovo, Slovakia

Solar Section,
Slovak Astronomical Society

23rd SOLAR PHYSICS MEETING

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communicates with ChemiX digital processing unit and executes received telecommands. The BPM is capable to sort out *in situ* abundances of individual particle constituents from electrons up to oxygen nuclei.

Combined study of radiation belts by the satellite particle telescope STEP-F and solar soft X-ray photometer SphinX during recent deep minimum of solar activity

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We present several new features detected in the high energy particle distributions of the Earth's magnetosphere during deep minimum of solar activity. This new outcome comes as a result of joint analysis of data base derived from two instruments: the satellite telescope of electrons and protons STEP-F and from the solar photometer in X-rays SphinX. Both instruments have been flown in 2009 aboard ***CORONAS-Photon***, the low, circular and highly inclined orbit satellite. Due to orthogonal orientation of viewing axes of STEP-F and SphinX instruments we have seized an opportunity to study anisotropy of particle beams in different volumes of the near Earth space at the height of ~550 km.

The comparison of data obtained from both instruments allowed to specify that Sun-oriented soft X-ray photometer SphinX detected electrons of intermediate and subrelativistic energies and their bremsstrahlung contributing to the signal observed predominantly in the last bins of 256 channel's dynamical energy spectra. By this way SphinX extended the energy range of particle being detected by STEP-F towards lower energies.

We present peculiar characteristics of electrons at the off spurs of traditional Van Allen outer and inner radiation belts, inside the region of South Atlantic Anomaly, and outside of well known zones of enhanced particle fluxes during the weak geomagnetic storm of May 6-8, 2009. In the research presented, the lifetimes of electrons under both belts, directivity of particle fluxes, variability of energy spectra in different zones of magnetosphere, the splitting of outer radiation belt during the recovery phase of mentioned above storm and interplanetary shock of August 9, 2009 are discussed. The comparison of analyzed data obtained aboard ***CORONAS-Photon*** with particle fluxes observed at L1 Lagrange point as well as on geostationary GOES satellite data allows advancing the concept of different physical mechanisms of populating enhanced electron fluxes during the initial and recovery phases of a substorm. From this standpoint we consider electron flux pulsations during various phases of geomagnetic activity as an important constituent of space weather.

Effect of the non-equilibrium ionization by the electron beam on EUV spectra

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It is widely anticipated that the solar corona is heated by small scale and possible recurrent nanoflares. Theenergyrelease by the magnetic reconnection accelerates particles and form an electron beam. Therefore, we investigated an effect of the periodic high-energy electron beam on the synthetic EUV spectra. Initially, plasma has the Maxwellian distribution. It is supposed, thatplasma interacts with high-energy beam during the first-halfperiod and the electron distribution during this interaction can be described by a kappa-distribution. The ionization, recombination, and excitation rates for the both distributions were used to calculate the time-dependent non-equilibrium ionization state, EUV synthetic spectra and their averages over one period.Weconsiderperiods several tens of seconds corresponding to exposure times or cadences of space-borne spectrometers. It is shown that plasma is out of the ionization equilibrium for the whole timein the coronal conditions.The instantaneous spectra