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PROJECT FOR SPACE PATROL OF SOLAR IONIZING RADIATION

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This paper presents the Russian project "Creation of the permanent space patrol of solar extreme ultraviolet and X-ray radiations (0.14-135 nm) from full disk of Sun. Now this permanent satellite monitoring of the ionizing solar radiation still does not exist: only a few short-term experimental satellites have covered parts of this region of the solar spectrum. Namely National Oceanic and Atmospheric Administration (NOAA - GOES satellites) utilizes the upper (energy) end (0.05-0.8 nm) of this spectrum to monitor the Sun for solar cycle and rotation variations and for large episodic events, i.e. flares. The monitoring at the wavelengths 121.6 nm (line Lyman alpha of atomic hydrogen) and higher already exists (Upper Atmospheric Research Satellite (UARS)). Without solar flare monitoring it is impossible to predict solar flares, their classes, the intensity of EUV and soft X-ray radiations and also the whole combination of the solar events related with a flare: the formation of solar energetic protons, electrons, high-velocity plasma streams in the solar wind, coronal mass ejection and, the most important, the beginning of principal magnetic storms.

As a result it would be impossible to predict the catastrophic events associated with solar flares and geomagnetic storms that are disturbances of the long-distant radio communication, failures of large electric systems and gas pipe-line breaking. The Patrol creation would provide a new scientific base for study of the role of solar events in meteorology, ionospheric and space weather, failures of the board instruments of spacecrafts, medical, and probably in the social problems and the seismic catastrophes. Taking into account the future plans for creation of the large long term orbital stations the influence of solar activity including flares and geomagnetic storms on the increase of the upper atmosphere density becomes very important resulting in the slowing down of large spacecrafts.

The technical approach for creation this Patrol will be based on the methods developed by the State Optical Institute. These methods consist of the simultaneous registration of solar fluxes by the soft X-ray and EUV-grating spectrometers for range 1.8-60 and 54-140 nm with spectral resolution of 0.3 - 1 nm and X-ray and EUV-radiometer for range 0.14-135 nm consisting of 20 filters (foils, submicron films and crystals). The spectrometers and radiometer are equipped with the open electron multiplier with photocathode, which is "solar blind" and characterized by high sensitivity in the soft X-ray and EUV region and by large dynamic scope equal up to 10^{**7} . The latter characteristic enables to carry out the measurements both for quiet Sun and during the solar flares. The spectrometers measure the detailed spectral function and its variations whereas the optical sensors of the radiometer (six sensors for different angles) give the initial information which enables to extract solar flux signals and to correct absolute measurements by taking in to account the scattered light in the spectrometers. The separation of two signals one of which is generated in the radiometer by solar photons and the others by the charged particles of radiation belts is fulfilled by the comparison of the reading of two optical sensors one of which is oriented towards Sun while the others

characterized by the same (or nearly the same) angle registers the charged particles. These instruments and methods have been tested on the board of the Soviet satellites "Cosmos-262" and "Cosmos-381"

Topic 2. Astromomics mission. English. poster session

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