STATION OF OPERATIVE FORECAST OF SOLAR ACTIVITY USING RADIO OBSERVATIONS: NEW PROJECT

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The project goal:

1. Solar flares diagnostics.
2. Research of global oscillations of the Sun.

The RT-22 CrAO is an unique Ukrainian radio telescope used for the observations of the Sun, galactic and extragalactic sources of space radiation in the spectral range of 2–35 mm. A monitoring of the solar activity together with of space weather observations is possible only in an alert regime, as the RT-22 CrAO participates in the European VLBI and the majority of the time is assigned to the observations under the astrophysical and geodynamic programs.

With a purpose of the monitoring of the solar activity by radio methods the small radio telescopes intended for daily measurements of the solar radio emission in cm- and mm-ranges are necessary. The choice of a range is stipulated by the circumstance that sources of outbursts occur in the solar chromosphere where the centimeter and millimeter radiation is generated.

In previous years the RT-22 CrAO participated in the international programs on the solar activity research. The new outcomes on study of global oscillations of the Sun, on diagnostics of solar flares, under the definition of physical conditions in the activity complex are obtained.

The helioseismological researches are extremely important for developing a model of the interior structure of the Sun. New measurements of the global oscillations spectrum of the Sun by radio astronomical methods carried out in the laboratory of the radio astronomy of CrAO, testify to comparability on an exactitude of a wireless and optical methods.

The research of the global oscillations of the Sun concern to the basic trends of a science and have an applied value.

Now it is evident that the upgrading of the receivers intended for the observations of the radio radiation of the Sun is necessary. A life expectancy of these receivers is calculated to be twenty years.

Essence of the project:

1. The RT-22 CrAO radio telescope in the multiwaves regime can be equipped with a package of reception modules at 17.0, 15.4, 13.3, 10.6, 8.6, 5.8 GHz frequencies.
2. The RT-2 solar centimeter radio telescope can be equipped with reception modules at 5.8, 10.6, 15.0 GHz frequencies.
3. The RT-1 solar millimeter radio telescope can be equipped with receivers at 30, 45, 90 or (22, 36, 45) GHz frequencies.
4. The extension of the frequency range of the RT-3 radio telescope receivers using two radiometers at 2.85 and 2.5 GHz.

Novelty: the realization of this radio astronomical project will allow Ukraine to enter adequately into the Solar Observation Optical Network.

Perspectives of the project realization:

The RT-22 CrAO is arranged with the perfect control system permitting to realize all the necessary conditions for solar observations. The assembly of an antenna with diameter of 2.5 m is completed in 2000 year. Laboratory of the radio astronomy of the CrAO arranges a precision parabolic mirror by the diameter of 90 cm and rotary device from a package of a Siberian Solar Radio Telescope. There are some institutes in Ukraine where the microwave amplifiers for these radio astronomical complex can be made.