

ARAS - ACTIVITY IN RADIO ASTRONOMY AT SOFIA

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In 2005 the ARAS team began development of low budgetary radio telescopes purposing 1) to create facilities for long time monitoring of solar activity and processes in the system “solar wind – earth magnetosphere” and 2) to create base for development of instrumentation, international cooperation and education.

At first time we construct small solar radio telescopes for three wave ranges - decameter, with Yagi antenna, 1 m, with spiral antenna, and 10.7 cm, with parabolic antenna. The goal is the monitoring of the flux from the outside corona, inside corona and chromosphere, respectively. In 2006 some test observations with the prototypes of the small radio telescopes were made [1].

One special implementation in the ARAS is the monitoring of the extremely low frequency (ELF) radio signals, with $\nu < 30$ Hz and $\lambda > 10\,000$ km. They correspond to the large-scale phenomena in the ground and the void between the ground and the ionosphere, caused probably by the fluctuation of the solar wind, power lightings and earthquakes. The ELF phenomena are various and uninvestigated. Generally, the ELF signals appear as sporadic wave packets at intervals of some decades of seconds, with duration a few seconds. Our first registrations were made with a big ferrite antenna and special low frequency radio detector, constructed in agreement of the design of Diedrich [2]. One typical registration of ELF signals is shown in Fig.1.

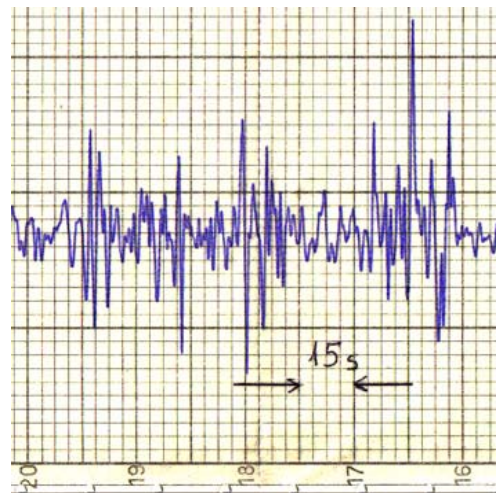


Fig.1. Flux registration of four ELF signal packets separated by 30-40 s, observed in the range 0.5-15 Hz with maximum sensitivity at 2 Hz.

In the close future the ARAS team purposes to finish the prototype devices and to automate the measurements.

References

- [1] L. Ilchev, B. Deshev , T. Georgiev , I. Parov (2006) *Proceedings of the 7th Meetings in Physics at Sofia University*, (in print).
- [2] K. Diederich, ELF signals, [<http://www.cqham.ru/articles/detail.phtml?id=473>]