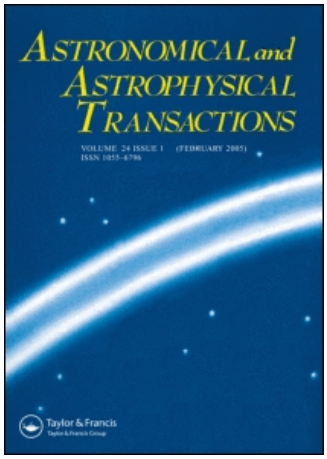

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An upgrade of the izmiran's solar digital radio spectrograph: First results

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AN UPGRADE OF THE IZMIRAN'S SOLAR DIGITAL RADIO SPECTROGRAPH: FIRST RESULTS

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The IZMIRAN's solar meter digital radiospectrograph was newly upgraded at the end of 1999. Some outstanding meter solar radio bursts have been registered by this device with enhanced time resolution and frequency range during the first half of 2000. Radiospectra of these events (mainly complicated type II bursts) and accompanying data are analysed.

KEY WORDS Solar radio bursts, dynamic spectra, observations

1 HISTORY

Daily patrol observations of the sporadic solar radio emission at the meter frequency range by IZMIRAN have been carried out since 1967 (Markeev, 1961; Korolev, 1975). All this time we have used generally uniform methods and devices: a set of sweeping receivers with a sweeping frequency of 50 Hz. In addition, observations with fixed frequency radiometers at some meter and centimeter frequencies are also carried out for intensity measurements. But the number of receivers (and, therefore, the frequency range of the device), the receivers themselves, aerials and the system of registration is regularly upgraded. Since 1996 the registration has been digital. At the end of 1999 one more upgrade of the IZMIRAN's radiospectrograph was made. Regular observations with the new parameters began on February 1, 2000 (see Figure 2).

2 UPGRADED RADIOSPECTROGRAPH

Now the upgraded radiospectrograph consists of four receivers scanning the frequency ranges 25–50 MHz, 45–90 MHz, 90–180 MHz, 180–270 MHz simultaneously

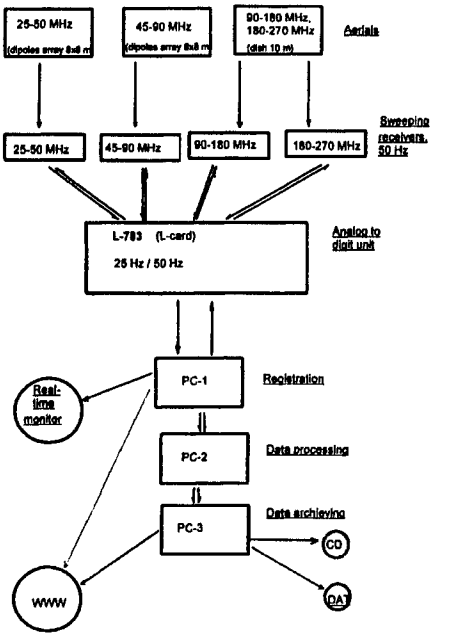

Figure 1 Scheme of the IZMIRAN Solar Digital Radio Spectrograph (last upgraded February 1, 2000).

(see Figure 1) and a multichannel analogue to digital converter (ADC). Two high-frequency receivers work with the 10-meter dish aerial, others – with separate dipole arrays aerials.

Each receiver scans its range 50 times per second, but the ADC digitises every scan (50 Hz) in alert mode only. In patrol mode the ADC digitises each second scan (25 Hz). So, the time resolution of the radiospectrograph is 0.04 s in the patrol mode and 0.02 s in the alert mode.

Each scan through whole frequency range from 25 MHz to 270 MHz includes 1600 counts: 400 counts per receiver. The frequency resolution is 0.2 MHz and is determined by the bandwidth of receivers. The intensity dynamic range is from $\sim$ 10 s.f.u. to $\sim$ 10000 s.f.u. and may be adjusted depending on the requirements.

3 OBSERVATIONS AND DATA PROCESSING

The observational time for the daily patrol is 06 UT–12 UT (07 UT–12 UT during winter daylight saving time). Alert observations are available from 04–18 UT depending on the season. During the observations, the registered dynamic spectra are imaged on a PC monitor and written to the hard disk. After the end of observations the data are transferred to another computers for preliminary processing

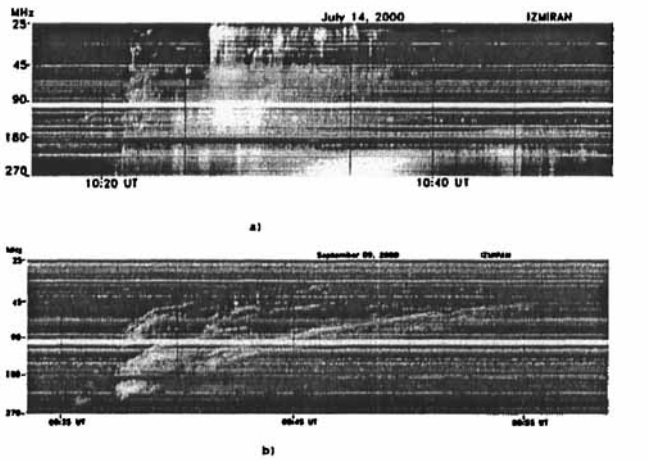

Figure 2 Examples of dynamic spectra obtained by the upgraded radiospectrograph: (a) radio evidence of the famous halo-CME associated event of July 14, 2000 at meter wavelengths: a complicated multishock and/or multiharmonic type II + type IV + type III radio burst; (b) a CME-associated long duration multiharmonic type II burst of September 09, 2000 with a complicated spectral structure.

and archiving. Only intervals without events are cut out. All events are recorded to CDs; some long noise storms are recorded to DAT tape too.

4 DATA ACCESS

The spectral data are published monthly in the Solar-Geophysical Data (tables). These tables since 1990 and the current tables (daily updated the next day after observations) and selected spectra of outstanding bursts are available at the WWW-page *http://helios.izmiran.rssi.ru/lars/LARS.html* Data in FITS or other graphic formats are available through FTP by request. Two examples of dynamic spectra can be seen in Figure 2.

Acknowledgments

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