
Astro Space Center RadioAstron Newsletter Number 8 November 3, 2011

Russian version of the Newsletter can be found here: http://www.asc.rssi.ru/radioastron/news/news_ru.pdf

Space radio telescope tests in 6 and 1.35 cm bands

Many observations of space objects have happened by Spektr-R in October 2011 in 6 and 1.35 cm bands. Cassiopeia A, Moon, Jupiter, as well as the Crab nebulae were observed in a scanning mode of a single radio telescopes. Radio signals from all these objects were successfully detected. The space radio telescope pointing has proven to be very good and stable. Tests at these two bands continue in order to achieve high quality telescope calibration information.

First maser observations by the space radio telescope

First single dish observations of a space object have happened on October 29 and 30 when scientific and telemetry data were transmitted to the ground through the wide band 15 GHz data link between Spektr-R and Pushchino tracking station. This mode of observations and recording is similar to the one which will be used for interferometric experiments. A maser source W3(OH) was observed in the OH (1665 MHz) and H2O (22232 MHz) lines. They correspond to 18 and 1.35 cm RadioAstron bands. The measurememnts have happened at the Spektr-R separation from the Earth by 60 and 200 thousand kilometers.

See attached figure with the spectra produced by the RadioAstron in-orbit checkout team of Astro Space Center.

W3(OH) is located about two kiloparsec away from the Earth in our Galaxy in a proto-stellar region. Radio emission from the object was collected by the 10-m space radio dish, digitized and formatted on-board, sent by the high-gain 1.5-m antenna to the Pushchino tracking station, decoded and recorded on the RadioAstron data recorder at the tracking station. Recorded data were transmitted to Astro Space Center over a dedicated Internet line. Data analysis in Astro Space Center confirmed the maser lines in both bands in left and right circular polarizations at expected frequencies, with expected amplitude and shape. As a result, this experiment has confirmed the full functionality of the space segment of

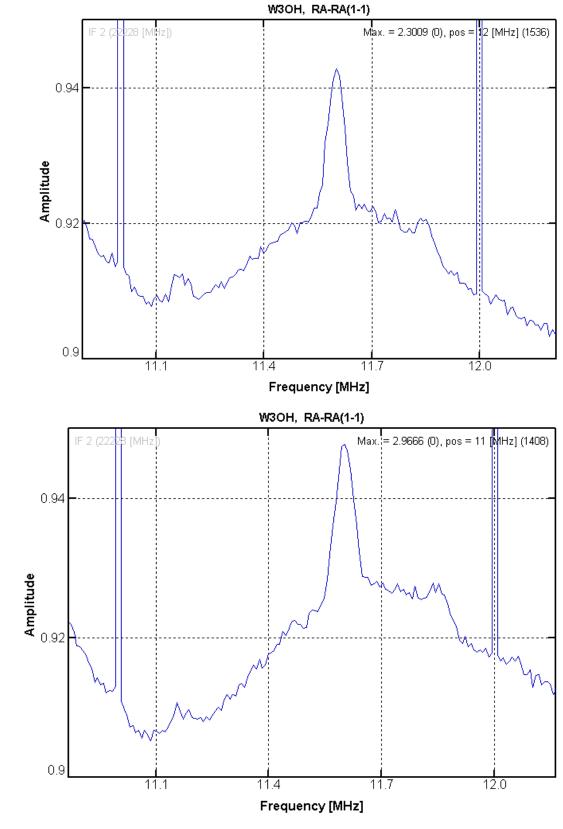
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interferometer.

First RadioAstron experiments in a mode of Space-Earth interferometer, so called fringe search, are planned to start in the second half of November 2011.

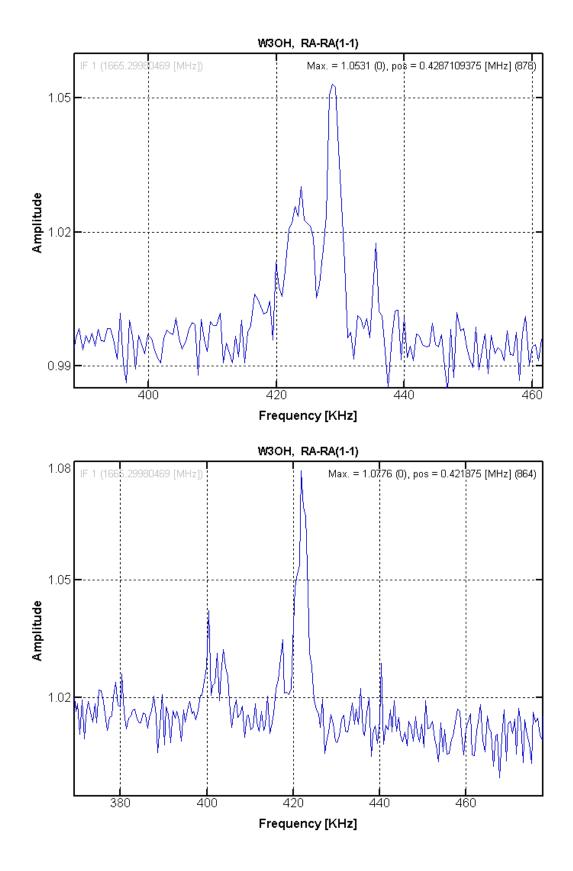
With best regards, Nikolai Kardashev (nkardash@asc.rssi.ru) Yuri Kovalev (yyk@asc.rssi.ru)

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October 30, 2011, 10:44 UTC

In-orbit Radioastron 1.35 cm receiver spectral response on the W3(OH) maser, water vapor (H₂O) line component at -50 km/sec: right (top) and left (bottom) circular polarization. Amplitude is shown in arbitrary units.



October 30, 2011, 08:35 UTC

In-orbit Radioastron 18 cm receiver spectral response on the W3(OH) maser, hydroxyl (OH) line component: right (top) and left (bottom) circular polarization. Expected difference in the right and left circular polarization spectra is apparently on the plots. Amplitude is shown in arbitrary units.