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Astro Space Center
RadioAstron Newsletter
Number 11
December 23, 2011
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Russian version of the Newsletter can be found here:
http://www.asc.rssi.ru/radioastron/news/news_ru.pdf

First interference fringe at 6 cm!

According to the RadioAstron in-orbit checkout plan, first interferometric observations at 6 cm were performed on December 1, 2011. The target was chosen to be the bright, compact and distant active galaxy BL Lacertae. The correlated interference signal was immidiately found by the Astro Space Center RadioAstron correlator with a high signal-to-noise ration between the space and all ground radio telescopes, namely, Eupatoria (Ukraine), Effelsberg (Germany), Medicina (Italy), Yebes (Spain). See fringe examples in the attachement. The successful detection of interference fringes demonstrates the overall excellent status of the complex system at the 6 cm band and reflects the rediness of RadioAstron to start early science observations.

We are pleased to report that ground-space interference fringes at 18 cm were also found in our experiment on November 23 with all participating telescopes which include the 100-meter GBT (NRAO, USA) and 64-meter Usuda (JAXA, Japan) together with the Russian and Ukranian VLBI stations.

A quick success at both 18 and 6 cm bands allowed teh RadioAstron team to start science observations earlier than planned originally. Five SVLBI observing sessions were performed between December 10 and 14 on the extragalactic target BL Lacertae at 18 and 6 cm. Observations of this active galactic nucleus were done for baseline projections from several to more than 20 Earth diameters. The ground VLBI support was provided by the Quasar network, Eupatoria, Yebes, Medicina, Effelsberg. An extra interest is determined by the fact that BL Lacerta went in December 2011 through a major flaring event in radio. Analysis of these observations should allow for a significant step towards better understanding of physical processes in the core of this galaxy.

Giant pulses from the Crab pulsar

The RadioAstron network of the space and ground telescopes has observed gian pulses from the Crab pulsar on November 15, 2011. This experiment was performed in order to check synchronization accuracy of the space and ground time. The Crab pulsar emits so called giant pulses which are thousand times more luminous than its regular pulses. These giant pulses were successfuly detected at 18 cm at the space (Spektr-R) as well as ground (Quasar network, Eupatoria) radio telescopes. Scientists have successfully cross-identified giant pulses at all these telescopes. They matched with an accuracy about or better than one microsecond. This indicates a high reliability of the time synchronizaton between the space and ground telescopes. See figure of one of gian pulses detected by RadioAstron attached.

With best greeting to the New Year 2012!
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P.S. Astro Space Center is very happy to congratulate academician Nikolai Kardashev with the award of the 2012 Grote Reber Gold Medal for innovative and significant contributions to radio astronomy.
http://www.qvmag.tas.gov.au/?articleID=539

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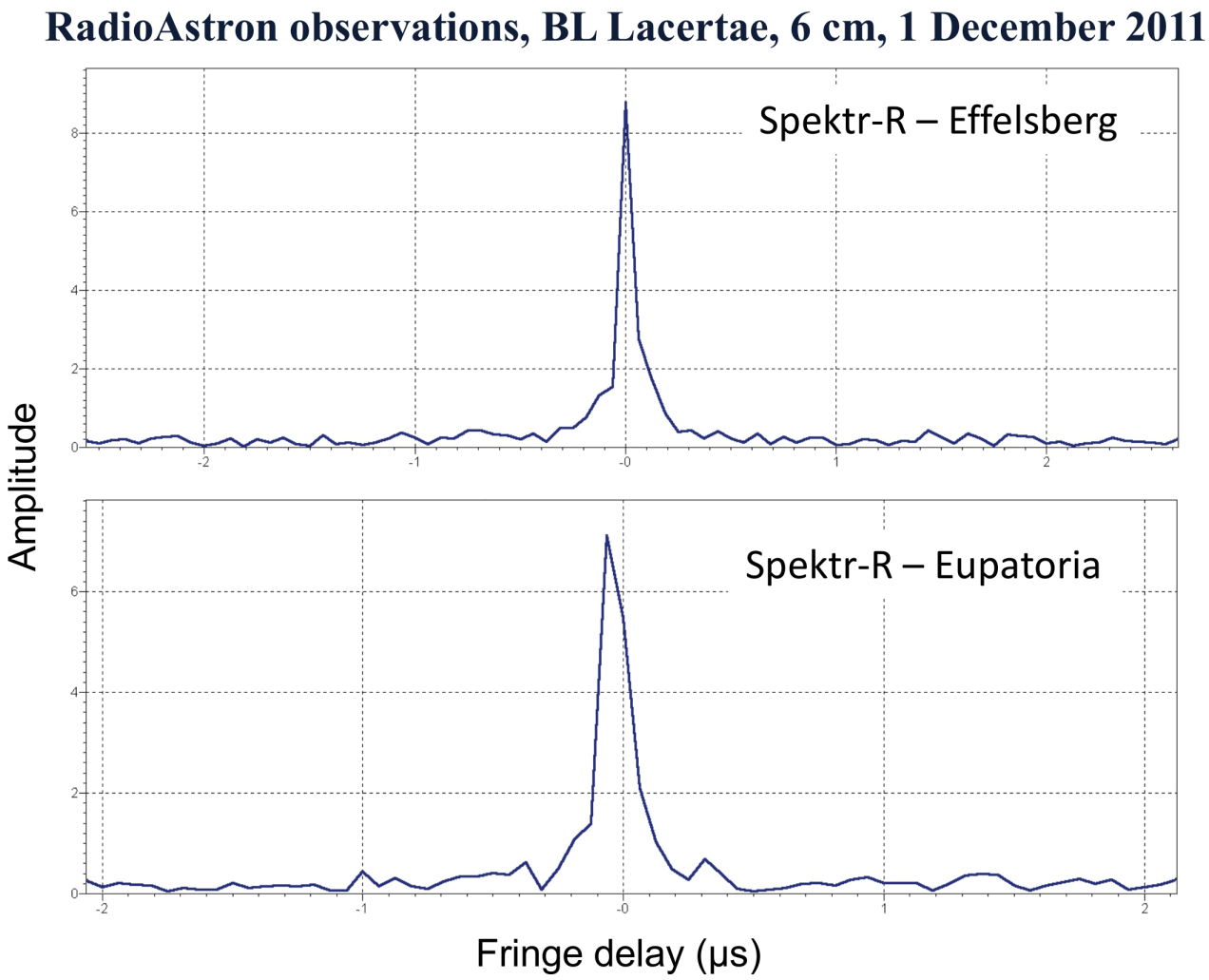
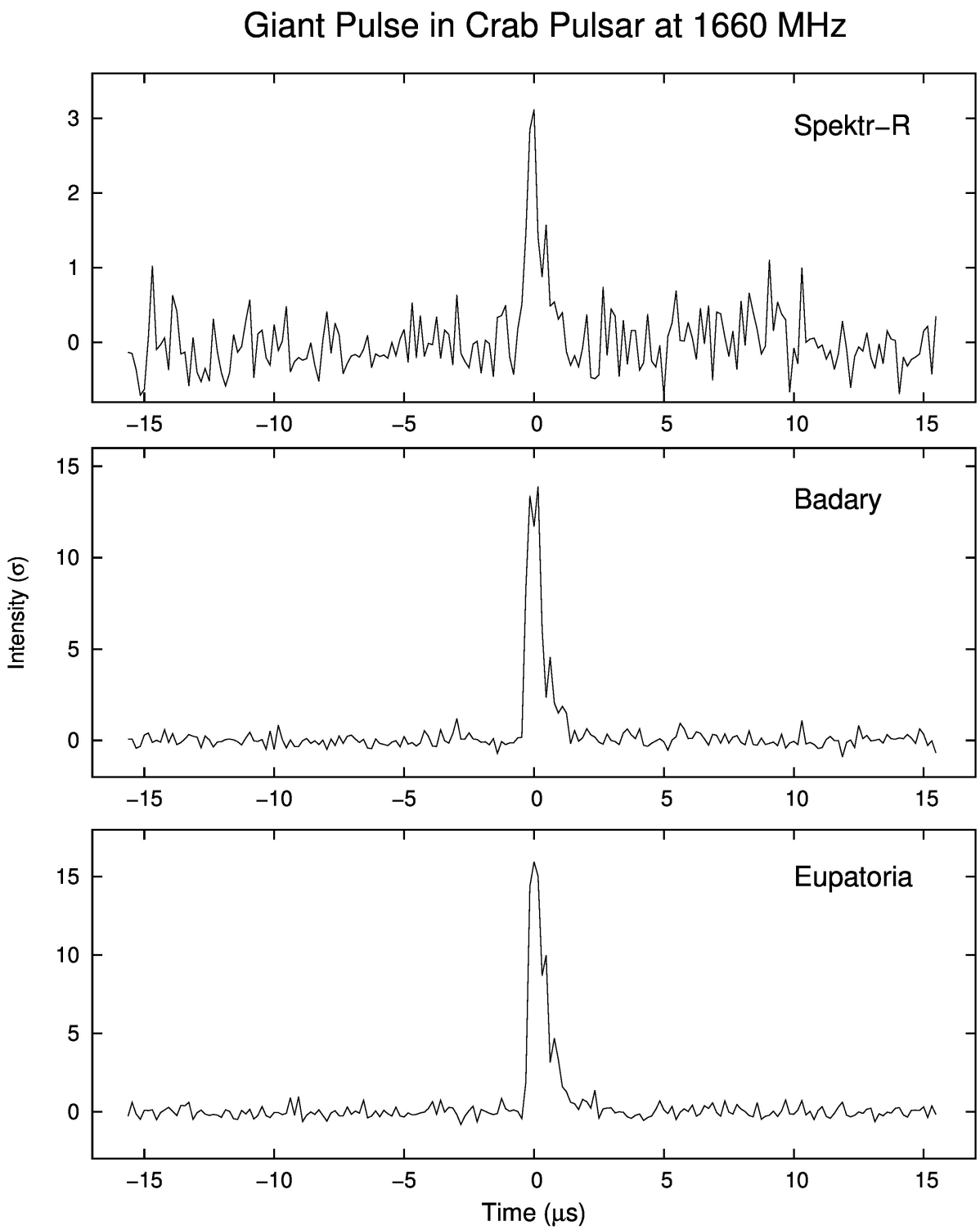


Interference fringe on the Spektr-R – Effelsberg (top) and Spektr-R – Eupatoria (bottom) baselines from the active galaxy BL Lacertae. Observations were made on December 1, 2011, at the wave length 6 cm. The space radio telescope was located about 50,000 km away from the Earth during the observations with a projected interferometer baseline of about 100 mega wavelengths. The amplitude is shown in arbitrary units. Integration time: 15 seconds. The amplitude of the correlated signal in arbitrary units is shown versus residual fringe delay.



A giant pulse from the Crab pulsar detected (from top to bottom) at the space radio telescope Spektr-R, ground radio telescope in Badary and Eupatoria. Observations were made on November 15 at 18 cm. Amplitude in SNR (signal-to-noise ratio) units is shown versus relative time.