

## The RadioAstron AO-5 open science program: July 2017 – June 2018

The RadioAstron observations currently cover the fourth year of the open program within the approved AO-4 proposals. Starting from July 2017, the RadioAstron mission will move into the fifth year of its program, AO-5 observations will continue until June 2018. We note that an orbit correction is planned for July 2017 which will affect the RadioAstron observing schedule in July and August 2017. The fifth RadioAstron Announcement of Opportunity has invited proposals of the following two types: the “Key Science Program” (KSP) and “General Observing Time” (GOT). See for details the full set of announcement documents in <http://www.asc.rssi.ru/radioastron/ao-5/ao5.html>.

All proposal were evaluated by the RadioAstron Program Evaluation Committee (RPEC) which was appointed by the RadioAstron International Science Council (RISC). Results of the evaluation were approved by the RadioAstron project director Nikolai Kardashev. RPEC members for AO-5 are Jason Hessels (U. Amsterdam, the Netherlands), David Jauncey (CSIRO, Australia), Matthew Lister (Purdue U., USA), Alexander Pushkarev (CrAO, Russia), Mark Reid (chair, Harvard CfA, USA), Olaf Wucknitz (MPIfR, Germany). Below we list 11 accepted projects which have requested observations with RadioAstron during the AO-5 period in their submission order:

- GOT: “Visibility tracking of hyper-compact H<sub>2</sub>O maser spots for studying interstellar micro-turbulence”, PIs: Hiroshi Imai (Kagoshima U., Japan), Alexey Alakoz (ASC Lebedev, Russia);
- GOT: “Monitoring of substructure in scattering disk of pulsar radio emission”, PI: Carl Gwinn (UCSB, USA);
- GOT: “Brightest objects in the distant Universe”, PI: Leonid Gurvits (JIVE and TU Delft, the Netherlands);
- KSP: “Evolution of high brightness temperature AGN cores with RadioAstron”, PI: Yuri Kovaliev (ASC Lebedev, Russia);
- KSP: “Probing the innermost regions of AGN jets and their magnetic fields”, PI: Jose-Luis Gomez (IAA, Spain);
- GOT: “Probing interstellar scattering material using dense RadioAstron observations of refractive substructure in AGN”, PI: Mikhail Lisakov (ASC Lebedev, Russia);
- GOT: “Observations of the central maser regions in H<sub>2</sub>O megamaser NGC4258 with ultimate angular resolution”, PI: Willem Baan (ASTRON, the Netherlands);
- GOT: “Early stages of massive star formation regions as seen with RadioAstron in H<sub>2</sub>O maser lines”, PI: Stan Kurtz (UNAM, Mexico);
- KSP: “Gravitational redshift experiment with RadioAstron”, PI: Valentin Rudenko (SAI MSU, Russia);
- KSP: “The nuclear structure in M87 with RadioAstron”, PI: Tuomas Savolainen (Aalto U., Finland; MPIfR, Germany);
- GOT: “Resolving the gamma-ray production region in sources J0211+1051 and S5 1044+71”, PI: Victor Patino-Alvares (MPIfR, Germany).

Among the approved projects, six got rank 'A' (the highest priority). A total of more than 160 co-investigators represent 20 countries. The largest number of co-Is are from Russia, other countries with a high number of co-investigators include the USA, Germany, Spain, the Netherlands, Australia, Canada.

## **The absolute record of angular resolution by RadioAstron. Again.**

While the readers are welcome to enjoy recent RadioAstron publications (<http://www.asc.rssi.ru/radioastron/publications/publ.html>), we are happy to announce a new absolute record of the angular resolution which was achieved detecting the megamaser in NGC 4258 at 1.3 cm on the RadioAstron Space Radio Telescope to Medicina (Italy) baseline of 340,000 kilometers (26.7 Earth diameters, 8  $\mu$ as). The previous record of 11  $\mu$ as on the same megamaser by the RadioAstron SRT to the GBT baseline was announced during the EVN symposium in Sankt-Petersburg.

In the same time, within a dedicated experiment on the glorious pair of the quasars 3C 273 and 3C 279, a very compact core was detected in 3C 279 at 1.3 cm by the SRT to the Jansky VLA baseline of 235,000 kilometers (18.5 Earth diameters, 12  $\mu$ as).

These results are crucial to probe the physics of both the water vapor megamasers and the extremely bright and compact cores of quasars.

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The RadioAstron project is led by the Astro Space Center of the Lebedev Physical Institute of the Russian Academy of Sciences and the Lavochkin Scientific and Production Association under a contract with the Russian Federal Space Agency, in collaboration with partner organizations in Russia and other countries.

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