NRAO eNews

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Upcoming Events

Pulsars: Astronomical Gifts That Keep on Giving (https://science.nrao.edu/science/event/aas-2012/aas-science-symposia#2)
Feb 17, 2012 | Vancouver, BC

New Frontiers in the Radio Universe (https://science.nrao.edu/science/event/aas-2012/aas-science-symposia)
Feb 19, 2012 | Vancouver, BC

2nd EVLA Data Reduction Workshop (https://science.nrao.edu/facilities/evla/early-science/DRW-spring2012)
Feb 22 - Mar 1, 2012 | Socorro, NM

Outflows, Winds and Jets Workshop (https://science.nrao.edu/facilities/alma/naasc-workshops/jets2012)
Mar 3 - 6, 2012 | Charlottesville, VA

Global Properties of HI in Galaxies Workshop (https://science.nrao.edu/science/event/tf35)
Apr 1 - 3, 2012 | Green Bank, WV

Synthesis Imaging Workshop (http://www.aoc.nrao.edu/events/synthesis/2012/)
May 29 - Jun 5, 2012 | Socorro, NM

ALMA Early Science Cycle 0 Status Report

The Joint ALMA Observatory has released a status report on Cycle 0 observing and a statement about the timeline for ALMA Early Science Cycle 1. The full report can be found **here (https://almascience.nrao.edu/news/alma-early-science-cycle-0-status-report)**. ALMA started scientific operations on 30 September 2011. While the quality of the data being collected is excellent, the completion rate of projects is lower than planned. To increase the likelihood that most PIs of the highest priority Cycle 0 projects will receive scientifically valuable data sets, the Cycle 0 observing period will be extended until the end of 2012. This extension will not delay completion of the array.

The observatory plans to release information regarding the capabilities and timeline for ALMA Early Science Cycle 1 in April 2012. Theproposal deadline is expected to be in July 2012 with the start of Cycle 1 observations at the beginning of 2013.

The highest priority of the ALMA project continues to be the completion of the full array, expected in the

second half of 2013.

ALMA in 2011 and Prospects for 2012

Al Wootten

(images/1_1.jpg)

Figure 1. ALMA makes Early Science observations under the Southern Cross. Photo courtesy C. Padilla, NRAO/AUI/NSF.

Zoom (images/1_1.jpg)

During 2011, ALMA Operations began in earnest with the successful Call for Proposals, which resulted in 2898 registrations at the **ALMA portal (http://almascience.nrao.edu)** . Proposal submission was followed by the assessment of the 919 proposals submitted. Scheduling and execution of the first batch of the **112 highest ranked proposals (https://science.nrao.edu/science/science-program/alma/cycle-0-highest-priority)** began on 30 September. By early December, quality assurance and packaging of the first project datasets had finished and delivery of the first data packages to principal investigators followed. By the February 2012 shutdown, nine periods of Early Science have been executed on the growing array.

Prior to Early Science, several science verification datasets were released on the ALMA portal to demonstrate the quality of ALMA data and its consistency with previous observations. Seven science verification datasets have now been released; a paper on one of these public datasets has already been published.

ALMA construction completed 2011 with 20 antennas delivered from the three vendors. The three Front End Integrations Centers delivered 25 new Front Ends, or receiver packages, to outfit those antennas. The units in the antenna cabin through which the Front Ends communicate with the equipment in the Array Operations Site Technical Building (AOS TB) are called Antenna Articles, and 66 of these were delivered by the end of the year, one for each of the planned ALMA antennas. The Central Local Oscillator was also delivered and installed during 2011. It forms an important part of the ALMA nervous system, distributing and synchronizing signals across the array. The antenna stations for the central cluster are in the final stages of preparation, ready for the deployment of the Early Science Array into its extended configuration early in 2012. Thus far, ALMA has operated on a network of generators. The Permanent Power System erection was completed in 2011 and is due for deployment on the array during February 2012, improving the quality and reliability of the array electrical power.

(images/1_2.jpg)

Figure 2. The Atacama Compact Array: five 7m antennas and one 12m antenna. Photo by Cat Vlahakis.

Zoom (images/1_2.jpg)

The year 2011 also marked the beginning of the end for construction as some production lines manufactured their last units. The last of the four correlator quadrants was accepted. Two correlator quadrants were deployed at the AOS TB and a third was installed, while the fourth remained in Charlottesville for software testing. Receiver cartridges for the 3mm and 0.45mm bands completed production. Steel fabrication for the Vertex antennas was complete. All sixteen antennas for the Atacama Compact Array (ACA) were delivered to Chile from Japan. The ACA with its initial complement of antennas employed its correlator to produce the first interferometric and total power data. The penultimate software release was deployed on the array and new releases of CASA software were released to the community for the further reduction of the delivered ALMA data.

ALMA construction will continue through 2012, which will see delivery of most of the remaining hardware. The most exciting prospect for 2012 is, of course, the expected publication of the first papers from Early Science. Some early results are making the rounds of science meetings already, whetting astronomers' appetites for the announcement of the Cycle 1 Call for Proposals, expected within the next few months.

This Month @ the NAASC

New ALMA Science Verification Data Sets Available

New ALMA Science Verification data sets are available now from the **ALMA Science Portal (http://almascience.nrao.edu)** , or directly at **http://almascience.nrao.edu/alma-data/science-verification (http://almascience.nrao.edu/alma-data/science-verification)**

The new data sets are:

1. Spiral galaxy, M100, a mosaic image at Band 3
2. Interacting galaxy pair, The Antennae, a mosaic image at Band 6
3. Our Galactic Center, SgrA*, recombination lines at Band 6
4. Proof of Concept of Response to Targets of Opportunity, the GRB 110715A datum.

The data products released here contain raw, uncalibrated data together with the necessary calibration tables to allow users to try their hands at a complete data reduction. CASA data reduction scripts are included in the release as well. Calibrated versions of the data are also provided, as are reference images in FITS format.

Future datasets listed in the Science Verification pages will be released through the above URL, so please continue to check the site for updates.

These products are the result of a great deal of work by many people from all over the world, including the Science Team responsible for Commissioning and Science Verification, and the teams responsible for Science Operations at the ALMA Regional Centers and at the Joint ALMA Observatory (JAO).

Meet the NAASC: Post-Doc Kimberly Scott

(images/2_1.jpg) Kim Scott joined the NRAO last year in July as a North American ALMA Science Center (NAASC) postdoctoral fellow. Her primary research interest is in the formation and evolution of infrared-bright galaxies. Kim received her Ph.D. from the **University of Massachusetts, Amherst (http://www.astro.umass.edu)** under the supervision of Grant Wilson. Her Ph.D. work involved the detection and follow-up analysis of submillimeter-selected galaxies. These galaxies are some of the most massive starburst systems observed during the peak epoch of star formation activity, when the Universe was roughly a quarter of its current age. Before joining the NAASC, Kim was a postdoc at the **University of Pennsylvania (http://www.physics.upenn.edu/)**, working with Mark Devlin and James Aguirre on the multi-wavelength and spectroscopic follow-up of submillimeter galaxies. She uses a wide range of complementary data from radio, infrared, optical, and X-ray telescopes to characterize the star formation properties, gas content, and prevalence of active galactic nuclei in these submillimeter-bright systems, with the goal of better understanding how they relate to the types of galaxies observed in the local Universe. While at the NAASC, Kim will work with Kartik Sheth to study the evolution in the stellar and gas distribution of galaxies over the past eight billion years, which will provide information on the physical processes that drive the build-up of the Hubble sequence.

Kim works in the user support group at the NAASC, assisting with NRAO community events, user documentation for ALMA, and the reduction and analysis of ALMA science verification data. She can be reached at kscott@nrao.edu.

Versatile GBT Astronomical Spectrometer Sees First Light

Glenn Jones (NRAO/Caltech) and the VEGAS Team

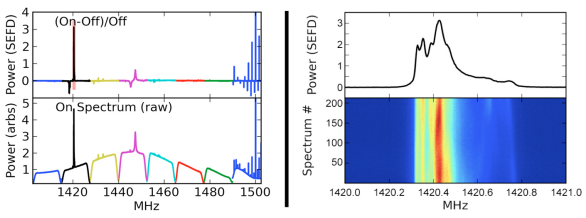

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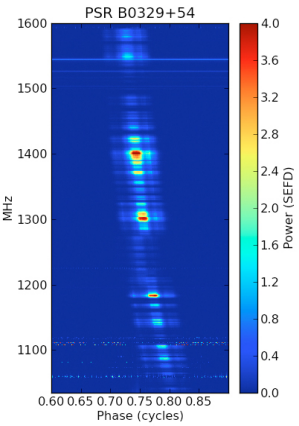
Figure 1a. [left] A VEGAS drift-scan observation of HI, illustrating the eight 12.5 MHz sub-bands. Figure 1b. [right] Detail of the HI line, as seen by VEGAS, and an initial drift-scan map.

Zoom (images/3_1.jpg)



(images/3_2.jpg)

Figure 2. Folded phase-frequency profile of the pulsar B0329+54.

Zoom (images/3_2.jpg)

A prototype version of the new Versatile GBT Astronomical Spectrometer (VEGAS) saw first light 16 December 2011 at the Green Bank Telescope. VEGAS is designed to harness the power of the new K-band Focal Plane Array by providing digital spectroscopy on up to eight dual-polarization inputs, each with a total bandwidth of up to 1.25 GHz. The instrument will be built with CASPER ROACH II FPGA boards feeding a cluster of GPU-enabled computers. These initial tests were performed with just a single feed at L-band to demonstrate the spectrometer.

Figures 1a and 1b show a drift-scan observation of neutral hydrogen. Figure 1a shows the spectrum from the eight 12.5 MHz sub-bands which are produced by the FPGA and then further channelized into 4096 channels by the GPU for a final resolution of ~3 kHz. A resonance in the L-band receiver can be seen around 1447 MHz, and some artifacts from interference are present in the sub-band above 1490 MHz. Figure 1b shows the detail of the hydrogen line and a crude drift-scan map of the data. The final system will provide eight independently tunable sub-bands.

In addition to high-resolution spectroscopy, VEGAS will also be capable of producing at least 1024 channels across the full 1.25 GHz band and supports integration times as short as 0.5 milliseconds, enabling wide bandwidth pulsar searches. Figure 2 shows a folded phase-frequency profile of the bright pulsar B0329+54. Filters in the receiver limit this test observation's bandwidth. The dispersion sweep of the pulsar is clearly visible. Horizontal lines are caused by interference, while peaks and nulls in the pulsar spectrum are caused by interstellar scintillation and the receiver gain response.

Jansky Lectureship Nominations

Chris Carilli and J.J. Utley

The National Radio Astronomy Observatory invites nominations for the 2012 Jansky Lectureship. The Karl G. Jansky Lectureship is an honor established by the trustees of Associated Universities, Inc. to recognize outstanding contributions to the advancement of radio astronomy. First awarded in 1966, it is named in honor of Karl G. Jansky who first detected radio waves from a cosmic source. For more information, visit the Jansky Lectureship **web site (http://www.nrao.edu/jansky/janskyprize.shtml)** .

Please send your nomination, including a concise justification for your choice, to **jutley@nrao.edu (mailto:jutley@nrao.edu)** by the deadline of March 16, 2012.

NRAO Outreach Events

EVLA Data Reduction Workshop

Gustaaf van Moorsel

This is a reminder that the 2nd EVLA Data Reduction Workshop will be held 22 February – 1 March 2012 at the Pete V. Domenici Science Operations Center in Socorro, NM. The aim of the workshop is to help participants cope with the new challenges posed by the increased power and complexity of the EVLA. The focus will be on reducing data taken in the wide-band WIDAR modes available to the observing community since 30 September 2011.

Unlike the September 2011 workshop, this event will consist of two distinct parts. The first, from 22 – 24 February, will be organized much like the September 2011 workshop, with presentations and hands-on tutorials. As in September, the number of participants will be limited to 40 persons. During the second part, from 27 February – 1 March, participants will be given the opportunity to reduce their own EVLA data during which local staff will be available for consultation. Due to the increased resources required, we must limit the number of participants for this second part to 30 persons.

Those interested can register for part 1, part 2, or both. For part 1, we will give preference to those who have not attended the September 2011 workshop. Since part II will require experience gained during either part 1 of this workshop, or the September 2011 workshop, we will give preference to those who have attended either of those events.

This is an advanced workshop, and unlike our Synthesis Imaging summer schools, is not intended for those who are new to radio interferometry. Prior experience with AIPS, CASA, or MIRIAD is required. We will be using CASA as our main data reduction package, but may use AIPS as well for some process steps. A working knowledge of CASA would be helpful.

Please register at the **Workshop website (https://science.nrao.edu/facilities/evla/early-science/DRW-spring2012)** which contains further information and a preliminary program. We look forward to welcoming you to Socorro!

Jets 2012

Anthony Remijan

(images/7_1.png)

Registration (https://science.nrao.edu/php/alma/jets2012/reg.php) and **abstract submission (https://science.nrao.edu/php/alma/jets2012/abs1.php)** for the North American ALMA Science Center (NAASC) 6th annual science workshop – Outflows, Winds and Jets: From Young Stars to Supermassive Black Holes – in Charlottesville, Virginia, 3-6 March 2012 continue. The preliminary science program is **on-line (https://science.nrao.edu/facilities/alma/naasc-workshops/jets2012/program)** .

Due to heavy demand for accommodations at the Jets 2012 Conference, you are encouraged to book your room(s) at the conference hotel (**Omni Charlottesville (http://omnihotels.com/FindAHotel/Charlottesville/MeetingFacilities/NRAO3.aspx)**) as soon as possible. The deadline for the special conference rate is February 10th.

The full registration fee is $375, but to encourage their participation, the student registration fee is only $125. Students who have requested financial support through this reduced registration fee must notify the LOC via **jets2012@nrao.edu (mailto:jets2012@nrao.edu)** and submit an abstract to present at least a poster at the meeting. However, all students are strongly encouraged to request a contributed talk. Students also receive half-price hotel rates, so those students sharing a room will have their entire lodging paid for by the workshop. Please email the LOC if you would like a find a roommate to take full advantage of this opportunity. On Sunday evening, workshop representatives will host a "Taste of Charlottesville". The LOC has made arrangements to host dinners for conference participants sampling the wide range of fare available by local Charlottesville restaurants on the historic Downtown Mall. The price for this "Taste of Charlottesville" is $50. Please keep that in mind when you register for the meeting. Other information about the meeting, including child-care options, is available through the **conference logistics website (https://science.nrao.edu/facilities/alma/naasc-workshops/jets2012/jets-2012-logistics)** .

If you have any problems, questions or concerns or if you have problems with the registration process, please contact LOC Chair Anthony Remijan at **jets2012@nrao.edu (mailto:jets2012@nrao.edu)** .

Global Properties of HI in Galaxies Workshop
Jay Lockman

A science workshop titled "*Global Properties of HI in Galaxies*" will be held 1-3 April 2012 at the NRAO in Green Bank, WV in honor of the 35th anniversary of the discovery of the Tully-Fisher relationship. This workshop will bring together researchers and students to discuss recent results on HI in galaxies. Topics will include:

- The Tully-Fisher Relationship and its application
- Structure of the nearby Universe revealed by HI Surveys of Galaxies
- The connection between global HI and galaxy properties
- The extended HI environment of galaxies

The intimate setting of the NRAO - Green Bank fosters highly interactive meetings. Because of physical limitations, the workshop will have to be limited to about 50 participants. There will be no registration fee, and meals and local housing will be provided without charge. Weather permitting; Workshop participants will be treated to a tour to the top of the 100-meter diameter Green Bank Telescope.

Immediately following the Workshop, there will be information and training sessions on use of the GBT and EVLA, and an ALMA Training and Community Day.

Additional information about this Workshop is **on-line (https://science.nrao.edu/science/event/tf35)** . Contact **jlockman@nrao.edu (mailto:jlockman@nrao.edu)** for information. We hope to see you in Green Bank!

13th Synthesis Imaging Workshop - First Announcement
Amy Mioduszewski

The 13th Synthesis Imaging Workshop will be held at the NRAO and the New Mexico Institute of Mining and Technology in Socorro, NM 29 May – 5 June 2012. In addition to introductory lectures on radio interferometry, advanced topics will cover a selection of new synthesis instruments, including the Atacama Large Millimeter/submillimeter Array (ALMA), the Expanded Very Large Array (EVLA), and the Long Wavelength Array. The workshop will also feature two days of hands-on data reduction tutorials, and tours of the EVLA and the Science Operations Center. Workshop attendance will be limited to 150 people.

The **Workshop web site (http://www.aoc.nrao.edu/events/synthesis/2012/)** provides additional information on scheduled lectures and events. If you are interested in receiving more information about the workshop, please pre-register on-line. Full registration will open 1 February, and will be on a first-come, first-served basis. Included in the registration fee is a copy of ASP Conf. Ser. Vol. 180, "Synthesis Imaging in Radio Astronomy II."

Information for participants outside the US: it is our understanding of current US policy that attending a scientific workshop in the US should only require a visitor visa. Should you find you need a letter of invitation, please contact Amy Mioduszewski. Due to processing delays, we strongly encourage you to start paperwork early.

The Synthesis Imaging Workshop is sponsored by the National Radio Astronomy Observatory, the New Mexico Institute of Mining and Technology, and the University of New Mexico.

Thijs de Graauw Receives 2012 Joseph Weber Award

(images/6_1.png)

Figure 1. Photo courtesy Joint ALMA Observatory.

Zoom (images/6_1.png)

The American Astronomical Society recently announced that the 2012 **Joseph Weber Award** (http://aas.org/prizes/joseph_weber_award_for_astronomical_instrumentation) for instrumentation has been awarded to Thijs de Graauw, Director of the Joint ALMA Observatory, "…for his leadership in the construction of powerful new astronomical instruments including the Short Wavelength Spectrometer on the Infrared Space Observatory (ISO) and the Heterodyne Instrument For the Infrared (HIFI) on Herschel."

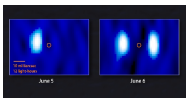
Recent Press Releases

ALMA Early Science Result Reveals Starving Galaxies
(http://www.nrao.edu/pr/2012/almastarvinggalaxies/)
11 January 2012

Astronomers using the partially completed ALMA observatory have found compelling evidence for how star-forming galaxies evolve into 'red and dead' elliptical galaxies, catching a large group of galaxies right in the middle of this change. **Read more** (http://www.nrao.edu/pr/2012/almastarvinggalaxies/) .

Iconic Telescope Renamed to Honor Founder of Radio Astronomy
(http://www.nrao.edu/pr/2012/jansky/)
10 January 2012

The world's most famous radio telescope will become the "Karl G. Jansky Very Large Array" to honor the founder of radio astronomy, the study of the Universe via radio waves naturally emitted by objects in space. **Read more** (http://www.nrao.edu/pr/2012/jansky/) .



VLBA, RXTE Team Up to Pinpoint Black Hole's Outburst
(http://www.nrao.edu/pr/2012/diskjet/)
10 January 2012

Astronomers have gained an important clue about a ubiquitous cosmic process by pinpointing the exact moment when gigantic "bullets" of fast-moving material were launched from the region surrounding a black hole. **Read more** (http://www.nrao.edu/pr/2012/diskjet/) .

Career Opportunities

New Postings

Co-op Student (https://careers.nrao.edu/applicants/Central?quickFind=50758) : The National Radio Astronomy Observatory in Socorro, New Mexico is accepting applications for a Co-op student. The work assignment will involve the location, identification, and logging of chemical materials in use at the VLA site, and the organization and re-publication of Material Safety Data Sheets (MSDS). This position is temporary full-time for a period of three months.

Head of Observatory Budgets (https://careers.nrao.edu/applicants/Central?quickFind=50745) : The National Radio Astronomy Observatory in Charlottesville, VA is seeking a Head of Observatory Budgets to manage, conduct and develop the Observatory-wide budgeting activities for NRAO, monitor for budget conformance and develop recommendations for adjustments; coordinate detailed financial analysis and research, monitor status of budgets and ledger reports; as well as assist project managers and various budgeting entities in submitting accurate and viable budget proposals.

Software Engineer II (https://careers.nrao.edu/applicants/Central?quickFind=50654) : (https://careers.nrao.edu/applicants/Central?quickFind=50664) The NRAO in Socorro, NM is accepting applications for a Software Engineer II. The successful candidate will work on one or more of the following applications: Observation Preparation Tool, Observation Scheduling Tool, and Archive Access Tool as well as perform routine maintenance and add new features to these tools. Initially the Software Engineer II will work primarily, but not exclusively, on user interface code for our web applications.

From the Archives

Ellen Bouton

(images/archives_1.jpg)

About this month's photograph: The winning cricket team, Socorro, November 1980. [Front row] Peter Napier, Chris Salter, Dave Gibson, Gareth Hunt (captain). [Back row] Carl Bignell (holding Celeste and John Bignell), Bill Randolph, Rosalie Ewald, Tim Cornwell, Eva Jean Rigby, Brook Ekers, Eric Russell, Clair Rigby. The VLA team (pictured) beat the Socorro team. Players represented the USA, Jamaica, India, England, Holland, New Zealand, and Canada. Writing in the January 1981 *Observer* (vol. 22, #1), Chris Salter said, "Passers by could be forgiven for imagining that mystical rites were being performed on the playing fields of New Mexico Institute of Mining and Technology on Saturday November 8th [1980]. The fact of the matter is that the slow perambulations and weird cavortings of fourteen white clad figures did not mark a frightening outbreak of alien worship but the progress of the first Socorro/VLA cricket match."

From the Archives is an ongoing series illustrating NRAO and U.S. radio astronomy history via images selected from our collections of individuals' and institutional papers. If readers have images they believe would be of interest to the Archives, please contact Ellen Bouton, **ebouton@nrao.edu (mailto:ebouton@nrao.edu)** .

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