NRAO eNews

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NRAO AAS Events: Tuesday 7 January

A Splinter Session to assist AAS members unfamiliar with radio-wavelength observing

Splinter Session: Proposing for NRAO Instruments (https://science.nrao.edu/science/meetings/2014/223rd-aas-splinter-session/aas-splinter-session)
Tuesday 7 January @ 12:30 – 3:30 p.m. EST
Potomac 1, Gaylord Convention Center

Reception & presentation by NRAO Director, Tony Beasley

NRAO Town Hall (https://science.nrao.edu/science/meetings/2014/aas223/nrao-town-hall)
Tuesday 7 January @ 6:30 - 8:30 PM EST
Potomac Ballroom C, Gaylord Convention Center

Discussion about plans for telescopes designed to track the Universe during Cosmic Dawn

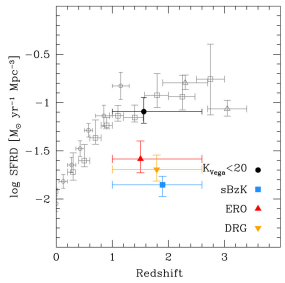
Splinter Session: Telescopes for Cosmic Dawn and 21 cm Cosmology (https://science.nrao.edu/science/meetings/2014/aas223/cosmic_dawn)
Tuesday 7 January @ 8:00 - 9:30 p.m. EST
National Harbor 12, Gaylord Convention Center

Other Upcoming Events

NRAO Science Symposia at the AAAS (https://science.nrao.edu/science/meetings/2014/aaas-2014/)
Feb 14 & 15, 2014 | Chicago, IL

3rd China-U.S. Workshop on Radio Astronomy Science and Technology (https://science.nrao.edu/science/meetings/2014/3rd-china-us-workshop/)
May 19 - 21, 2014 | Green Bank, WV

Stacking Analysis of ALMA Data: Sub-mm Galaxies in the Extended Chandra Deep Field South



Credit: credit

The Cosmic Star Formation Rate

In a recent 344 GHz continuum ALMA Cycle 0 study, Roberto Declari and his collaborators (2014) performed a stacking analysis of four classes of high-redshift galaxies selected based on optical and near-IR fluxes: the K-selected galaxies, star-forming sBzK galaxies, extremely red objects (EROs) and distant red galaxies (DOGs). These galaxies classes represent different criteria that were used to select star-forming galaxies prior to the advent of deep infrared (i.e., Spitzer and Herschel) datasets.

Density as a function of redshift. The unfilled symbols represent UV and mid-IR selected galaxies from prior studies of the SFRDs. The filled symbols are from Declari et al.

In the stacked images, each class is detected at the 10σ level. Herschel SPIRE data are combined with the stacked datasets in order to assess the spectral energy distribution (SED) of these galaxies. The infrared SED components are well fit by a modified blackbody with a $\beta = 1.6$ and a dust temperature of 30K. The derived infrared luminosities are in the range $0.5\text{-}1.1\times10^{12} L_\odot$, which corresponds to star formation rates of 75 - 140$M_\odot$ per year.

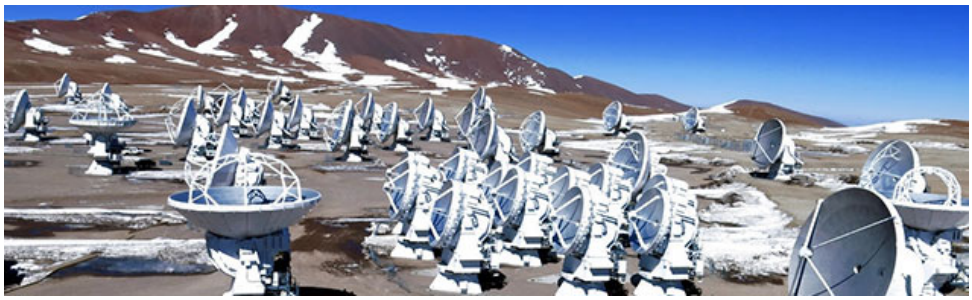
Finally, the authors place their analysis in the broader cosmological context by deriving star formation rate densities (SFRDs): the K-selected galaxies have SFRDs over the redshift range z =1 - 2.6 consistent with prior studies of rest-frame UV and 24μm selected galaxies which make use of infrared and radio data to estimate star formation rates. In contrast, the color-selected galaxy classes (sBzK, EROs, and DOGs) have SFRDs which are lower by a factor of three over the same redshift range.

Reference:

Roberto Declari et al (http://adsabs.harvard.edu/abs/2014ApJ...780..115D) ., 2014 ApJ, 780, 115.

Transformational Science in the ALMA Era: Multi-Wavelength Studies of Galaxy Evolution

4 – 7 August 2014
Omni Hotel, Charlottesville, VA



This workshop will explore four central themes in the field of galaxy evolution across a broad swath of the electromagnetic spectrum, bringing together astronomers using and preparing to use the Atacama Large Millimeter/submillimeter Array (ALMA) as well as other existing and future facilities including VLA/GBT/IRAM/CARMA, Hubble/Spitzer/Herschel/ Chandra/NuStar, JWST, MeerKAT/ASKAP/SKA, LSST, EUCLID, TMT/GMT/ELT, and CCAT/LMT.

The workshop will focus on four science themes:

- The mass assembly history of galaxies and formation and evolution of galactic structure;
- the evolution of the interstellar medium and star formation over cosmic time;
- the role of large scale structure and environment; and
- the role of AGN in galaxy evolution.

Within these broad themes, workshop participants will identify two to three critical questions in each theme that will most benefit from new data, and the participants will be invited to address these questions. This workshop will strive to foster discussion and debate and an active exchange of ideas with the goal of energizing the participants to address the outstanding questions in these areas using multi-wavelength data from all of these facilities.

For additional information, please visit the workshop website (https://science.nrao.edu/facilities/alma/naasc-workshops/alma2014) .

ALMA Project Status

Al Wootten

Credit: Philipp Weber-Bertram

ALMA Cycle 2 observing proposals are being processed. The number of North American proposals increased by 22% over those received in Cycle 1; the same increase was registered for proposals from US Principal Investigators. There were nearly 1500 unique investigators on proposals submitted from the North American Executive.

Cycle 1 science observations are being made with an array configured between C32-3 and C32-2. As summer weather envelops the ALMA site, the array will continue to move toward its more compact configurations; it is expected to move toward wider configurations as the austral autumn begins. Early Science Block 23 recently began.

A listing of objects observed by ALMA may be obtained via the ALMA Science Archive Query Form (https://almascience.nrao.edu/aq/) . PIs and Co-Is may query the status of their Project through the Project Tracker (https://almascience.nrao.edu/observing/project-tracker) .

As reported earlier, ALMA construction hardware has been delivered to the array in Chile. The final 'Station 3' verifications by the System Integration Science Team (SIST) at the Operations Support Facility (OSF) in northern Chile were performed on the final antenna, DA59, and its newly installed hardware on Christmas Eve. Groundbreaking for ALMA in Chile took place on 6 November 2003. The first integration verification occurred in 2009, followed by first fringes and closure phase at the Array Operations Site (AOS) later that year.

2014 Synthesis Imaging Workshop

Attendees of the 2012 Synthesis Imaging Workshop

The 14th Synthesis Imaging Workshop will be held 13-20 May 2014 at the NRAO and New Mexico Institute of Mining and Technology in Socorro, NM. The Workshop will comprise a week of lectures on aperture synthesis theory and techniques at a level appropriate for graduate students in astrophysics. The workshop will also include two days of practical tutorials demonstrating data collection, calibration, and imaging of various types of data, including data from the Jansky VLA, ALMA, and the VLBA.

Additional information is available online (http://www.aoc.nrao.edu/events/synthesis/2014/) . A formal first announcement will be distributed soon, and registration is expected to begin in early February.

Suspension of Page Charge Support

NRAO has had a longstanding policy of providing page charge support to authors affiliated with U.S. institutions publishing papers that report original observations utilizing the VLA, VLBA, and/or GBT, contain an original analysis of archival data from these instruments, and/or are based on a significant

amount of previously unpublished data from these telescopes. Beginning in 2012, this policy was extended to include ALMA.

The NRAO has been the only U.S. ground-based observatory to provide page support to its users in recent years. Unfortunately, as the result of a very challenging budget climate, we have had to curtail or suspend services to our user community. This includes page charge support.

Beginning 1 Jan 2014, NRAO is suspending page charge support for papers reporting observations from the VLA, VLBA, and GBT under the terms described above. As an instrument engaged in rapidly developing an expanding user base, page charge support for papers reporting ALMA results and data will continue. Page charge support will be reassessed as part of the planning process for fiscal year 2015.

NRAO Astronomer Jay Lockman Elected as AAAS Fellow

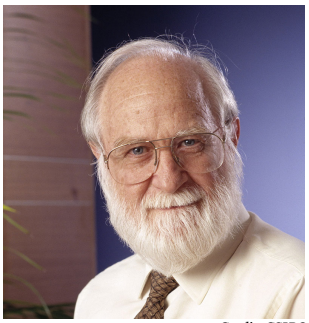
Jay Lockman

Felix J. "Jay" Lockman, an NRAO astronomer based in Green Bank, has been named a Fellow of the American Association for the Advancement of Science (AAAS). Jay was honored for his "*significant studies of neutral hydrogen in our galaxy and others, including the discovery of the 'Lockman Hole,' and for service to U.S. radio astronomy*." The Lockman Hole is an area of the sky near the constellation Ursa Major that has a remarkably low concentration of neutral atomic hydrogen. This makes it a useful window on the distant universe for certain X-ray and ultraviolet observations. Lockman received his Ph.D. from the University of Massachusetts, Amherst, in 1979 and began work at NRAO in 1978.

The tradition of AAAS Fellows began in 1874. Election as a AAAS Fellow is an honor bestowed upon AAAS members by their peers. New Fellows will be presented with an official certificate and a gold and blue rosette pin at the February 2014 AAAS Annual Meeting in Chicago.

Grote Reber Medal Awarded to Ron Ekers

Ken Kellermann



Credit: CSIRO

Ron Ekers

The 2014 Grote Reber Gold Medal for innovative and significant contributions to radio astronomy will be awarded to former NRAO Very Large Array Director, Ron Ekers, who is currently a CSIRO Fellow at the Australia Telescope National Facility and Adjunct Professor at Curtin University in Perth.

Ekers is being recognized for his many pioneering scientific investigations which extend over half a century of research. Working with various colleagues, Ron made the first determination of the radio galaxy luminosity function, made a precise measurement of the deflection of radio waves by the Sun, and acquired some of the first high-resolution images of the radio emission from the center of our Galaxy. He also studied the acceleration of the solar wind, gamma-ray bursts, and the distribution of HI in galaxies. More recently, Ekers has led a project to detect radio emission resulting from neutrino interactions with the Moon.

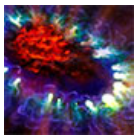
On the technical side, Ron was instrumental in developing the Groningen Image Processing System (GIPSY), probably the first interactive language for analyzing radio astronomy images. He also was key to

developing a technique to compensate for missing short spacings in radio arrays that led to the current practice of mosaicking. Ron also led the drive to develop phased array feeds, and starting in the mid-1990s, he became the strongest force in developing and advocating support for the international Square Kilometre Array initiative.

Ron Ekers graduated from the University of Adelaide in 1963 and received his PhD from the Australian National Radio Observatory in 1967 for research done under John Bolton at Parkes. In addition to NRAO, Ron has worked at Caltech, the Institute of Theoretical Astronomy in Cambridge, and at the University of Groningen in the Netherlands. In 1987 he returned to Australia to become the Director of the Australian Telescope National Facility, and in 2003 he became an Australian Federation Fellow. He is a Fellow of the Australian Academy of Sciences and the Royal Society of London, a Foreign Member of the Royal Dutch Academy of Science and the American Philosophical Society, and from 2000 to 2006 he served as President of the International Astronomical Union. Over the course of his outstanding career he has served on numerous advisory boards and committees and has received many awards and prizes including the NRAO Jansky Lectureship in 2004.

The 2014 Grote Reber Medal will be presented to Professor Ekers during the 31st URSI General Assembly to be held in Beijing, China in August 2014. The Reber Medal was established by the Trustees of the Grote Reber Foundation to honor the achievements of Grote Reber and is administered by the Queen Victoria Museum in Launceston, Tasmania.

Recent Press Releases & Announcements



Supernova's Super Dust Factory Imaged with ALMA (https://public.nrao.edu/news/pressreleases/alma-images-supernova-dust-factory)
6 Jan 2014

Striking new observations with the Atacama Large Millimeter/submillimeter Array (ALMA) (https://public.nrao.edu/telescopes/alma) telescope capture, for the first time, the remains of a recent supernova brimming with freshly formed dust. Read More ... (https://public.nrao.edu/news/pressreleases/alma-images-supernova-dust-factory)

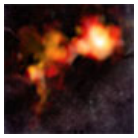
Pulsar in a Stellar Triple System Makes Unique Gravitational Laboratory (https://public.nrao.edu/news/pressreleases/pulsar-in-stellar-triple-system)
5 Jan 2014

Astronomers using the National Science Foundation's Green Bank Telescope (GBT) (https://public.nrao.edu/telescopes/gbt) have discovered a unique stellar system of two white dwarf stars and a superdense neutron star. Read More ... (https://public.nrao.edu/news/pressreleases/pulsar-in-stellar-triple-system)

New Studies Give Strong Boost to Binary-Star Formation Theory (https://public.nrao.edu/news/pressreleases/new-study-boosts-binary-star-formation-theory)
31 Dec 2013

Using the new capabilities of the upgraded Karl G. Jansky Very Large Array (VLA) (https://public.nrao.edu/telescopes/vla), scientists have discovered previously-unseen binary companions to a pair of very young protostars. The discovery gives strong support for one of the

competing explanations for how double-star systems form. Read More ... (https://public.nrao.edu/news/pressreleases/new-study-boosts-binary-star-formation-theory)



Starless Cloud Cores Reveal Why Some Stars Are Bigger Than Others (https://public.nrao.edu/news/pressreleases/starless-cores)
20 Dec 2013

Massive stars – those at least 8 times the mass of our Sun – present an intriguing mystery: how do they grow so large when the vast majority of stars in the Milky Way are considerably smaller? Read More ... (https://public.nrao.edu/news/pressreleases/starless-cores)

Career Opportunities

New Postings

Project Manager (https://careers.nrao.edu/) **:** The NRAO is recruiting for a Project Manager to manage, plan, and coordinate activities of projects to ensure that goals or objectives are accomplished within prescribed time frame and funding parameters. This is a temporary full-time position for a period of six months.

Array Maintenance Group Manager (https://careers.nrao.edu/) **:** The Joint ALMA Observatory (JAO) in Santiago, Chile is accepting applications for an Array Maintenance Group Manager (AMG). The successful candidate will be one of two AMG Managers in charge of leading a group of approximately 70 people in a rotating counter-shift, and will be responsible for ensuring all scientific subsystems are maintained according to the established maintenance processes. The term of appointment is three years.

Co-Op Student, Technical (https://careers.nrao.edu/applicants/Central?quickFind=50970) : The NRAO in Green Bank, West Virginia is seeking a Co-Op Student to work on FPGA-based data acquisition systems for experiments at the Green Bank site. The student will gain experience in designing, implementing, and testing FPGA designs, and in developing and deploying software for the control of the data acquisition instruments. This is a temporary full-time position for a period of three months.

Mechanical Engineer II (https://careers.nrao.edu/applicants/Central?quickFind=50962) : The NRAO in Socorro, NM is accepting applications for a Mechanical Engineer II responsible for the carrying out and assisting in engineering analysis, design, and general execution of a project or whole system. Responsibilities include recommendations, coordination and assisting in decisions on such aspects as design, procurement, manufacture, erection, test and some degree of initial operation.

Head of the ALMA Department of Engineering (ADE) (https://careers.nrao.edu/applicants/Central?quickFind=50965) : The Joint ALMA Observatory (JAO) in Santiago, Chile is recruiting for a Head of the ALMA Department of Engineering. The incumbent will be responsible for the management and leadership of the department, for the engineering and technical staff within the JAO and for the work outcomes from those staff including Systems Integration efforts, the ongoing engineering operations of the array and overall maintenance issues. The term of appointment is three years.

Technical Specialist II (https://careers.nrao.edu/applicants/Central?quickFind=50943) : The NRAO in Socorro, NM is accepting applications for a Technical Specialist II. Under general supervision from

scientists and engineers, the Technical Specialist assembles, calibrates, tests, analyzes, troubleshoots and/or repairs the Digital Transmission System and Receiver modules.

NRAO Postdoc (https://careers.nrao.edu/applicants/Central?quickFind=50956) : The NRAO in Green Bank, WV is seeking a NRAO Postdoc join their scientific staff. The successful applicant will have 50% of his/her time available for independent research, while 50% of his/her time will be devoted to support of the Robert C. Byrd Telescope (GBT) and GBT observers. This is a two-year appointment.

From the Archives

Ellen Bouton

About this month's photo: The VLA track crew has the difficult job of maintaining ~38 miles of double track. In winter 1996, the crew members reviewed job methods to uncover hazards, and wrote a Job Safety Analysis (JSA) for every track maintenance job they performed. Using the resulting JSA procedures, all regular and temporary crew members learned to recognize the hazards associated with each job and how to avoid them. The result: reported incidents went down by 78% over the previous two years! Left to right in this 1996 photo of the track crew at station N16: Adrian Pino, Jimmy Latasa, James Julian, Leandro Esquivel, Paul Savedra, Chester Moeller, Michael Torres.

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 (#) .

Contact the Editor (mailto:mtadams@nrao.edu?subject=NRAO eNews Editor)

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