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Currents

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NOAO Community Survey for Astro2020: As part of our preparation for the Astro2020 Decadal Survey, NOAO invites you to participate in our online community survey. The survey aims to understand your ground-based OIR resource needs and priorities for the coming decade, in areas such as

- Observing time and observing modes
- Archival data and data products
- Time domain services (e.g., alert brokers, follow up observing systems)
- Data discovery and analysis services (e.g., archives, science platforms)
- Other software-related services
- Specialized observing programs carried out on our facilities with external funding
- New instrumentation or facilities
- Student and mentor training

The closing date for the survey is **Friday, 17 May 2019**. This article links to the survey website. Read more…

Kitt Peak 4m Back in Action: After a 14-month hiatus, the Mayall telescope is back on sky as it prepares for the installation of the Dark Energy Spectroscopic Instrument (DESI). Equipped with a new top end and corrector, the Mayall recently achieved first light with the DESI commissioning camera. On-sky commissioning of DESI itself will begin in September 2019. Read more…

TripleSpec SV Underway at SOAR: Science verification with the TripleSpec infrared spectrograph began in April, and another science verification run is scheduled for mid-June. Proposals for the June run are being accepted, with a deadline of **Friday, 7 June 2019**. Read more…

Astro2020 Science White Papers and the US ELT Program: NOAO is compiling a collection of Astro2020 white papers that describe science for which ELTs will be particularly important. This article requests your help identifying "ELT-relevant" white papers that are not yet on our list and summarizes other recent developments in the US ELT Program. Read more…

Meeting Announcement — "Extremely Big Eyes on the Early Universe": Registration is open for the last of a three-part international conference series that will review the current state of the art in studying the high redshift universe and discuss how to best use giant telescopes to go beyond. The **9-13 September 2019**

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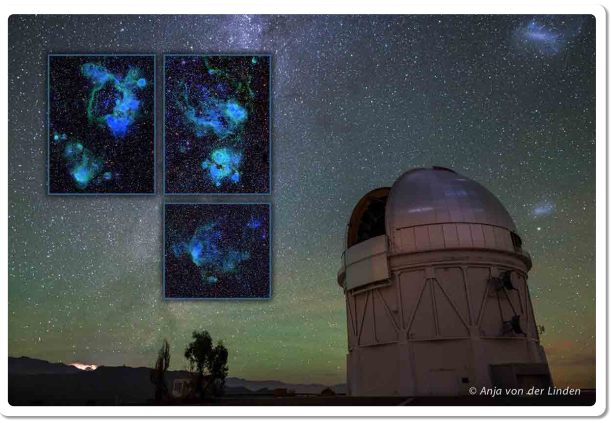
event, to be held in Rome, Italy, at the Accademia dei Lincei has a registration deadline of **15 June 2019**. Read more…

Meeting Announcement: The seventh annual GMT Community Science Meeting, on the topic of **"The Cosmic Baryon Cycle: Impact on Galaxy Evolution"** will be held **19-21 September 2019** in Carlsbad, CA. The deadlines are **24 May 2019** for contributed talks and **29 July 2019** to register. Read more…

NOAO in the News

Cosmic Fireworks in the Clouds: Volunteer Detectives Sought for Magellanic Clouds Cluster Search



Caught in a cosmic dance, our nearest neighbor galaxies, the Magellanic Clouds, are cartwheeling and circling each other as they fall toward our galaxy, the Milky Way. The gravitational interaction between the Clouds sparks cosmic fireworks—bursts of star formation as new clusters of stars flame on. How many and what kind of star clusters have been born this way over the history of the Clouds? A new project, the Local Group Cluster Search, invites citizen scientists to help find out!

Read more in NOAO Press Release 19-05.

NOAO Community Survey for Astro2020: Make Your Views (and Needs) Known!

As part of our preparation for the Astro2020 Decadal Survey, NOAO invites all interested members of the US community to participate in our online NOAO Community Survey. The survey solicits input on your needs and priorities for resources such as:

- Observing time and observing modes
- Archival data and data products
- Time domain services (e.g., alert brokers, follow up observing systems)
- Data discovery and analysis services (e.g., archives, science platforms)
- Other software-related services
- Specialized observing programs carried out on our facilities with external funding
- New instrumentation or facilities

- Student and mentor training

The survey results will be used in NOAO's planning process and input to Astro2020. The closing date for the survey is **Friday, 17 May 2019**.

Why Another Survey?

The last US community survey was carried out in 2011 by the US Ground-based OIR Roadmap Committee, and much has changed since then. For example,

- Many large survey data sets are now available, and "survey science" is a commonly used research approach in astronomy.
- LSST is imminent, bringing with it the demand for data services and time domain services.
- The ground-based OIR "System," the focus of the last community survey, has lost coordinated funding with the end of NSF's Telescope Systems Instrumentation Program (TSIP), although the NSF's Mid-Scale Innovations Program (MSIP) has since emerged.
- NSF's divestment from Kitt Peak's 4m Mayall, 3.5m WIYN, and 2.1m telescopes has opened up their use as platforms for exciting science programs enabled by external funding.

These changes raise important questions: how has the NOAO community changed in the last decade, and what are our community's needs and priorities for the coming decade? With the survey, we hope to gain insights into questions such as:

- What role will NOAO resources and services play in the ground-based OIR community's science in the 2020s?
- What impact has the NSF MSIP program had on our US community? Are there any adjustments to the program that would make it a more powerful tool for our community?
- How large are our communities for observing, data services, and other resources, and what are their priorities?

Survey Details

The survey should take 15-20 minutes to complete and covers 10 general topics. You can

- Skip sections you don't want to answer
- Page back and forth to change your answers

The penultimate page asks for your relative priorities among broad categories in a funding-limited environment. It's the "money question", so don't miss this one.

At the end of the survey, we ask for your email address to ensure that each survey response corresponds to a unique individual. If you indicated that you are interested in additional information on any topic in the survey, we will use this email address to contact you. The survey itself is anonymous: the results will be evaluated and reported in an anonymized way.

If you would like to view the entire survey before you begin, a pdf is available here.

Access the survey here.

If you have questions, concerns, or comments about the survey, please contact Joan Najita, NOAO Chief Scientist (najita@noao.edu).

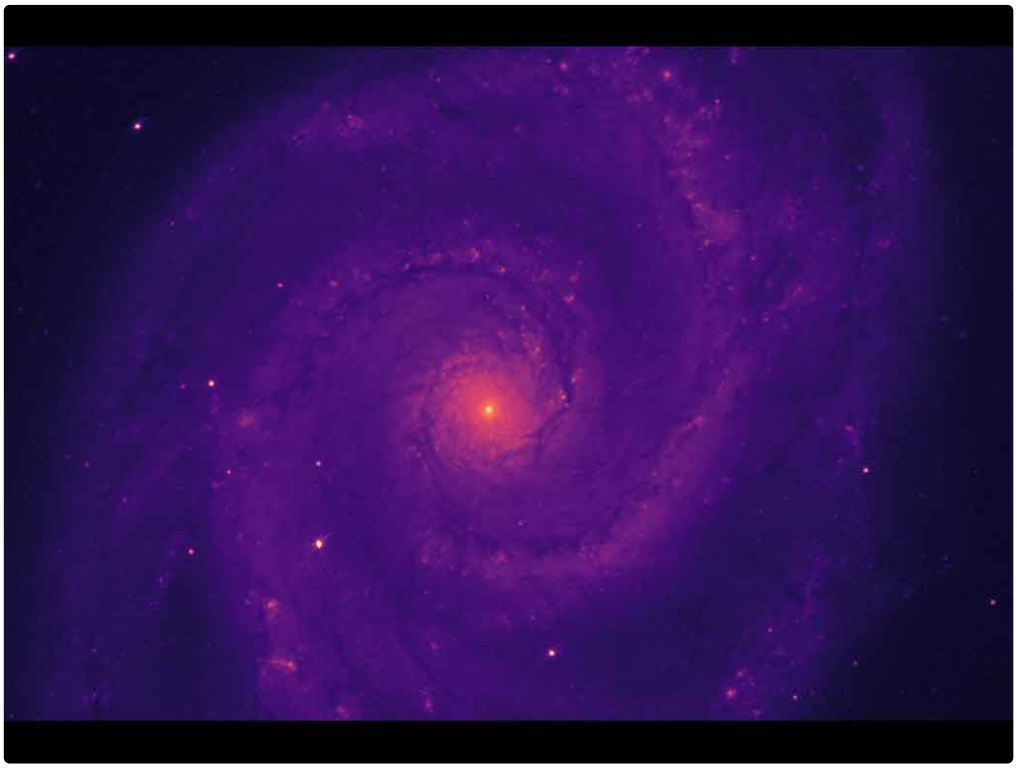
Kitt Peak 4m Mayall Back in Action

Arjun Dey, NOAO

After a 14-month hiatus, the Mayall 4m telescope is refurbished and back in action as it prepares for the installation of the Dark Energy Spectroscopic Instrument (DESI).

The Mayall was closed temporarily in February 2018 in order to install the new corrector that will deliver a corrected 3-degree diameter field for the DESI focal plane. The telescope now has a new top ring supporting a new 5-ton corrector barrel, which is controlled by a hexapod. The hexapod provides focus motion and tip/tilt correction to optimize image quality.

The overhauled Mayall achieved "first light" on 1 April 2019 with an imaging camera (the "Commissioning Instrument"). The DESI team is currently testing the optical and mechanical performance of the telescope and understanding the issues associated with target acquisition and guiding to the accuracy and precision required for DESI.



Some images from DESI construction, installation and first light. Hover your mouse over the image to pause the slideshow. Click the image to step through a larger version of the slideshow with captions.

The Commissioning Instrument campaign will continue through mid-May, after which the installation of the DESI focal plane will begin. The ten DESI focal plane segments, each of which holds 500 robotic fiber positioners, will begin arriving on Kitt Peak next month and will be mounted behind the corrector over the summer. Three of the ten DESI spectrographs have already been installed in the thermally

controlled "shack" in the old Mayall Coudé room, and the remainder are on schedule.

On-sky commissioning of DESI will begin in September 2019, followed by a "Survey Validation" phase during which the DESI team will test the system's ability to deliver redshifts for the faint DESI targets at sufficient completeness and reliability.

The DESI target lists are also in the process of being finalized. The DESI Legacy Imaging Surveys, which were conducted to generate these target lists, have now completed their data collection phase. The next data release (DR8) of the Legacy Imaging Surveys will cover more than 14,000 deg^2 of the extragalactic sky (at Galactic latitude |b| > 15) in the g, r and z bands and will be available publicly by June 2019.

At Kitt Peak, we are looking forward to an exciting new adventure with the venerable Mayall! For more details about DESI and first light, see https://newscenter.lbl.gov/2019/04/03/dark-energy-instruments-lenses-see-night-sky-first-time/

DESI is supported by the US Department of Energy's Office of Science; the US National Science Foundation, Division of Astronomical Sciences under contract to the National Optical Astronomy Observatory; the Science and Technology Facilities Council of the United Kingdom; the French Alternative Energies and Atomic Energy Commission (CEA); the Gordon and Betty Moore Foundation; the Heising-Simons Foundation; the National Council of Science and Technology of Mexico; the Ministry of Economy of Spain; and DESI member institutions. The DESI scientists are honored to be permitted to conduct astronomical research on Iolkam Du'ag (Kitt Peak), a mountain with particular significance to the Tohono O'odham Nation. View the full list of DESI collaborating institutions, and learn more about DESI here: desi.lbl.gov.

TripleSpec 4.1 Science Verification in Progress at SOAR

Jay Elias (SOAR Observatory) and Sean Points (NOAO)

SOAR began science verification with the TripleSpec infrared spectrograph in April, with a short but generally successful run in which several programs were completed or started. Another science verification run is scheduled for mid-June, and proposals are being accepted for that run.

Please see the science verification page for details on how to propose. The deadline for proposals for the June SV run is **Friday, 7 June 2019**. Further information on the instrument can be found on the website at http://www.ctio.noao.edu/soar/content/triplespec-41. We expect to update these pages as data from the April run are analyzed.

SOAR Telescope

Astro2020 Science White Papers and the US ELT Program

Mark Dickinson, NOAO

Astronomers are rarely at a loss for words to describe the scientific ideas that excite them. In an outpouring of enthusiasm, the astronomical community wrote nearly 600 science white papers for the 2020 Decadal Survey on Astronomy and Astrophysics (Astro2020). These white papers discuss forefront problems in astronomy for the next decade and beyond. In many cases, the white papers also elaborate the measurements that will be required to advance our knowledge at the frontiers of research.

In the next decade, a new generation of Extremely Large Telescopes (ELTs) with primary mirrors larger than 20m in diameter will open new vistas in astronomical research. ELTs will achieve very high angular resolutions at infrared wavelengths with diffraction-limited adaptive optics systems, and their large collecting areas will enable very sensitive observations of objects beyond the limits of today's 8m-class ground-based optical-infrared observatories.

Many white papers submitted to Astro2020 address scientific problems that require the angular resolution and sensitivity that the ELTs will offer. NOAO is compiling a collection of Astro2020 white papers on science for which ELTs will be particularly important. These white papers span nearly all areas of astronomical research, from our Solar System and extrasolar planetary systems to the early universe and cosmology. This list is still a work in progress: we have not yet read all 590 submissions! If you wrote an "ELT-relevant" white paper that is not yet on our list, or if you know of one that we've missed, please bring this to our attention by writing to useltp@noao.edu.

NOAO and the Giant Magellan Telescope (GMT) and Thirty Meter Telescope (TMT) organizations are collaborating to secure 25% or more of the observing time on the TMT and GMT to enable transformational research by the US national community. A US Extremely Large Telescope Program (US-ELTP) would permit scientists anywhere in the US to create and lead projects with the GMT and TMT, taking advantage of their combined full-sky coverage and diverse capabilities.

Some of the foremost scientific questions in the era of ELTs will require large observing programs, perhaps using multiple instruments and coordinating with other observational facilities. Key Science Programs (KSPs) are envisioned as a core component of the US ELT Program, motivated by problems that require large amounts of GMT and TMT observing time, and that are best addressed by coordinating scientists and resources throughout the community. KSPs will follow successful open-collaboration models that encourage broad, diverse participation by observers, data scientists, and theorists. This will enable scientists from a wide range of institutions to contribute to the KSP effort, and will ensure that the benefits of federal investment in GMT and TMT are widespread. Large, coherent investigations also typically produce large, coherent data sets with high legacy

value, enabling new science that may lie beyond the scope envisioned by the original proposing teams.

More than 250 community members responded to NOAO's call to participate in the development of Key Science Program concepts for the US ELT Program. The scientific discussions by these KSP teams motivated some of the white papers that were submitted to the Decadal Survey, and these are flagged in the table on NOAO's US-ELTP Astro2020 web page.

Many more Astro2020 white papers refer to ways in which ELTs can make unique new measurements in a wide range of research projects. Smaller-scale, PI-led investigations with GMT and TMT will also have an important role to play: they can be nimble, exploratory, and responsive to new opportunities. To this end, the US ELT Program would also support Discovery Science Programs (DSPs), selected at regular intervals through open competition and peer review.

As the Decadal Survey conversation continues, the NOAO will continue to gather more useful information about US ELT Program science on its web site. Stay tuned!

Extremely Big Eyes on the Early Universe III

Rome, Italy, 9-13 September 2019
Registration deadline: **15 June 2019**

"Extremely Big Eyes on the Early Universe" is a three-part international conference series focusing on the capabilities of a new generation of Extremely Large Telescopes for studying galaxy formation and evolution. Registration is now open for Big Eyes III, to be held at the Accademia dei Lincei in Rome, Italy, on **9-13 September 2019**.

In the next decade, the commissioning of Extremely Large Telescopes (20-40m class) will allow us to see the high redshift universe using new eyes of unprecedented power. By themselves or in combination with other facilities, these new eyes will have the potential to transform our understanding of the formation and early evolution of galaxies and black holes, first light and cosmic reionization, as well as the evolution of the intergalactic and circumgalactic media.

The Big Eyes conferences will bring together an international group of experts to review the current state of the art in the study of the high redshift universe and to discuss how best to use giant telescopes to learn about it. These meetings will address the following questions:

- What potentially transformative observations will be enabled by giant telescopes? What capabilities are required?

- What are the key synergies between giant telescopes and other facilities? What are the areas and topics where a concerted effort will yield far superior results than the sum of all parts?
- What theoretical or observational work is needed in preparation for first light? What are the limitations in our understanding that need to be overcome?
- What calculations are required in order to make testable predictions and interpret the results of future astronomical observations?

It is important to consider these questions now, while the plans for giant telescopes can still be influenced, and there is still sufficient time to carry out preparatory theoretical and observational work that will be needed to make the most of the large investments in these facilities.

For more information, please visit:

- Conference series: https://conferences.pa.ucla.edu/early-universe-2019/
- Big Eyes III in Rome: https://indico.ict.inaf.it/event/779/

The Cosmic Baryon Cycle: Impact on Galaxy Evolution

The seventh annual GMT Community Science Meeting, sponsored by the GMTO Corporation.
19 – 21 September 2019, Omni La Costa Resort and Spa, Carlsbad, CA
Contributed talk deadline: **24 May 2019**
Registration deadline: **29 July 2019**
http://conference.gmto.org

The rich taxonomy of galaxies we observe today is understood to be regulated by two competing processes: accretion and feedback. Understanding the intricate exchange of matter between star-forming regions and the intergalactic space and its impact on subsequent galaxy growth remains a primary goal in astrophysics research. This meeting will bring together leading theorists and observers to discuss the latest progress in studying baryonic flows in and out of galaxies with an outlook towards key growth areas in the era of giant telescopes. The participants are expected to address the following key questions:

- What are theoretical expectations and (in)direct evidence for accretion on scales of galaxy halos (~100 kpc) to scales of galaxy disks (~few kpc) at any redshift?
- What are theoretical expectations and (in)direct evidence for feedback on these same disk and halo scales?
- What are the extent and distinguishing signatures (kinematic, elemental abundances, etc.) of different feedback mechanisms, e.g., starburst, AGN, environmental?

Registration is now open, and the deadline for proposing contributed talks is **24 May 2019**. Check http://conference.gmto.org for more details.

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Contact Us

We welcome your input on this issue of *Currents*. Please contact us at currents@noao.edu. We look forward to hearing from you!