



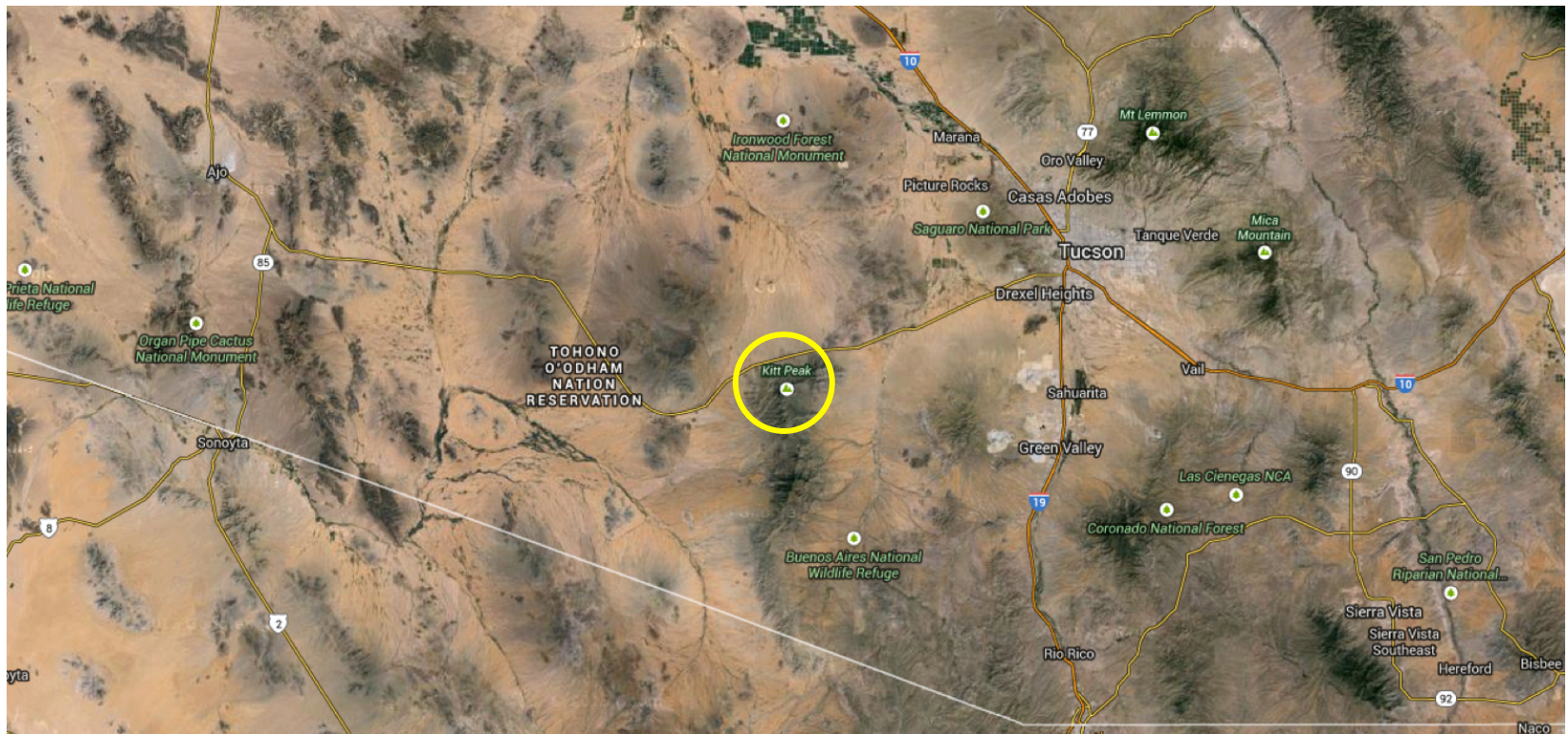
News from Kitt Peak National Observatory

Lori Allen, Associate Director for KPNO



Kitt Peak National Observatory

KPNO is located ~90 km west of Tucson, AZ, on the Tohono O'odham Nation at an elevation of 2100 m

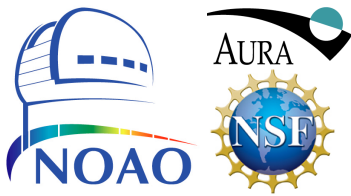




KPNO 2016 and beyond

- Major projects at Mayall 4m and WIYN 3.5m telescopes
 - Dark Energy Spectroscopic Instrument (DESI) – DOE + NSF
 - Extreme Precision Doppler Spectrometer (EPDS) – NASA + NSF
- New life for 2.1m telescope
- Current instrumentation
- Outreach & dark sky protection





U.S. DEPARTMENT OF
ENERGY

Office of
Science

KPNO/Mayall 4-m DESI, the instrument

Dark Energy Spectroscopic Instrument (DESI)

5000-fiber spectrometer @ Mayall 4-m

Components

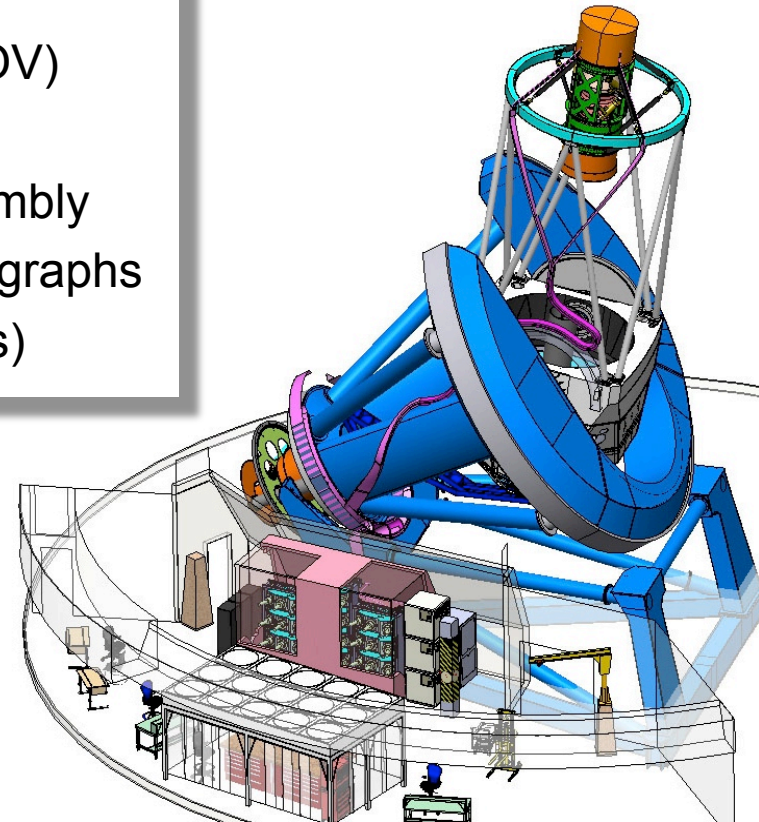
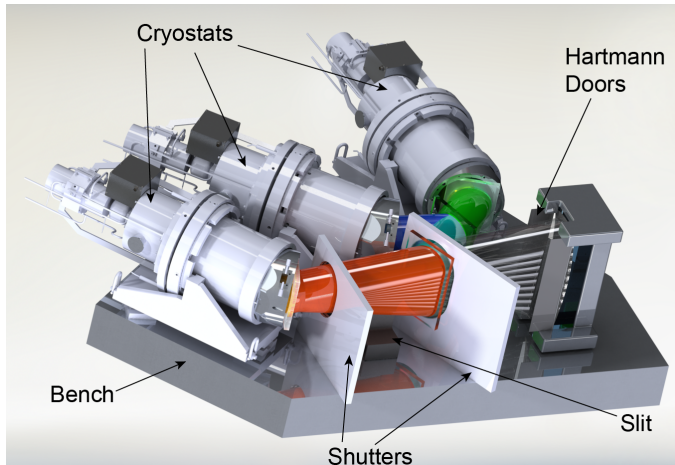
A new prime focus corrector (creating an 8 deg² FOV)

A focal plane with 5000 fiber positioner robots

A new top ring and cage, barrel and hexapod assembly

A fiber optic system to transport the light to spectrographs

Ten 3-arm spectrographs (cf., BOSS spectrographs)



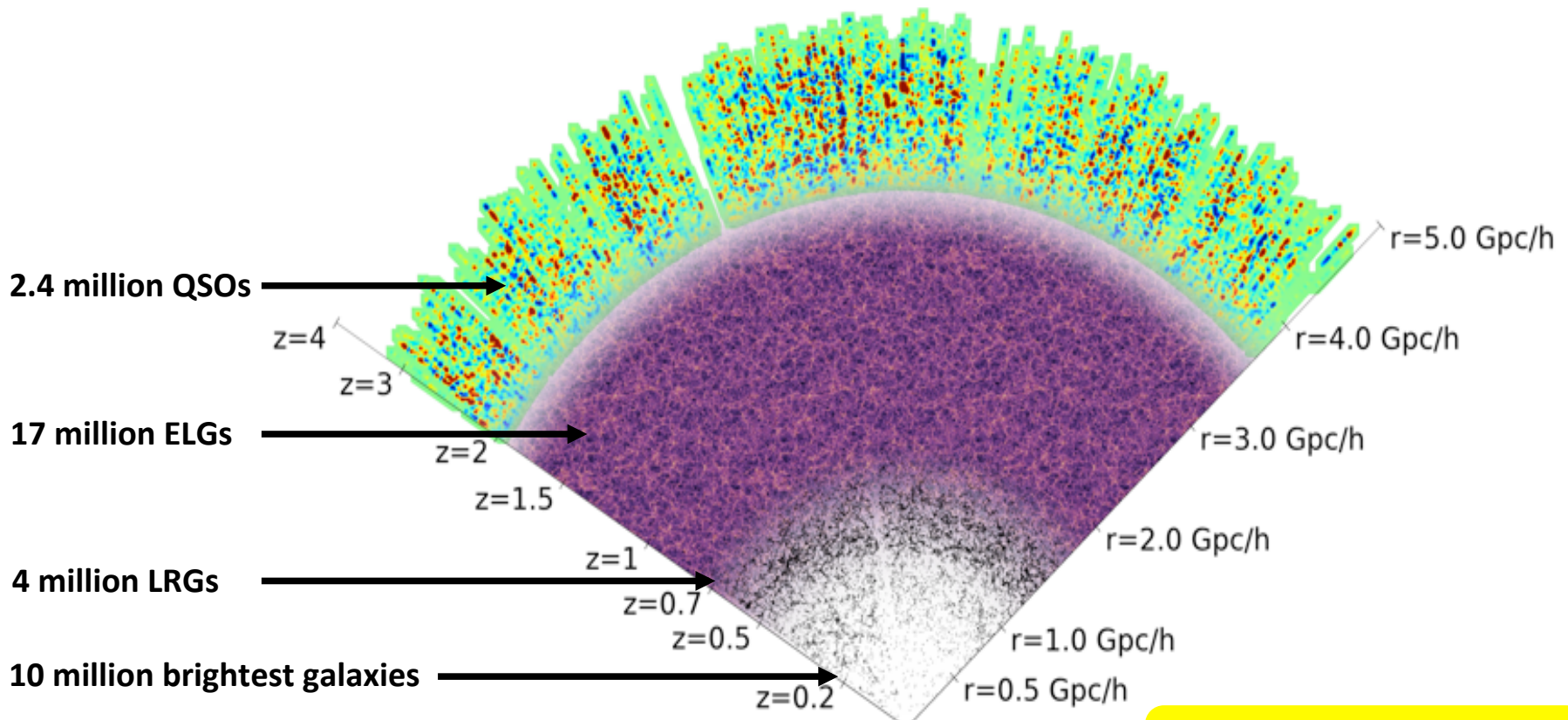
Images: M. Levi
DESI Project Director



KPNO/Mayall 4-m DESI, the experiment

Five target classes spanning redshifts $z=0 \rightarrow 3.5$.

~34 million redshifts over 14,000 sq. degrees (baseline survey).



Courtesy R. Wechsler
DESI Co-Spokesperson

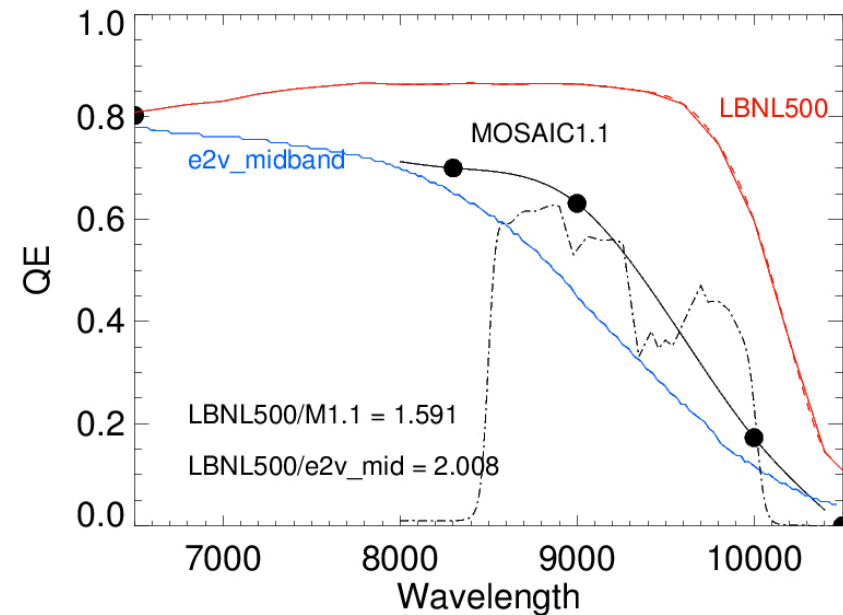
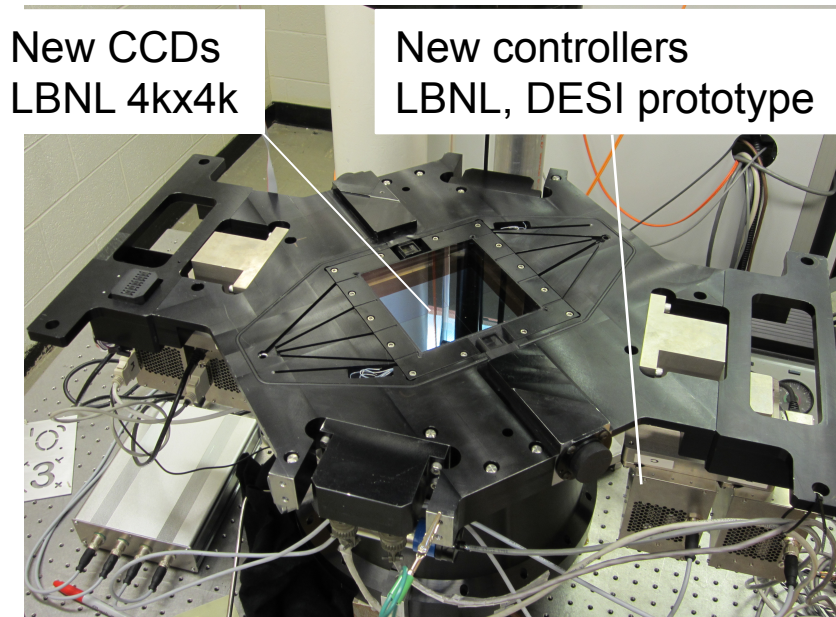
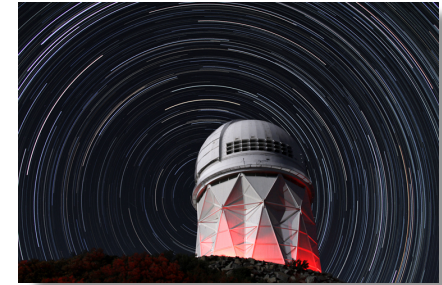


KPNO/Mayall 4-m DESI, the experiment

- All data products will be public
 - Targeting survey: images and catalogs
 - Spectra: 33M galaxies + 10M stars
- Public bright time program (2019 – 2023)
 - 500 bright-time hours available for community access
 - Program details under development
 - Watch for Announcement of Opportunity

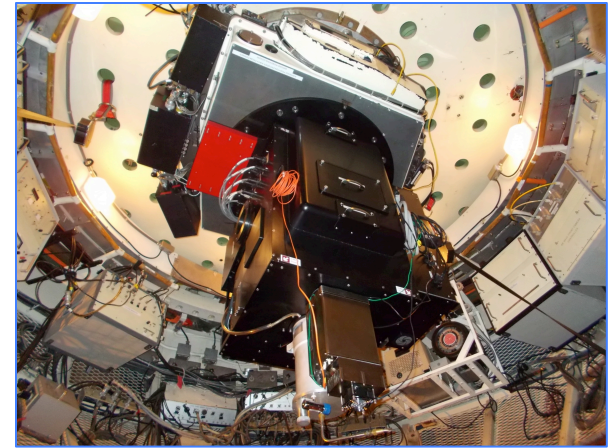
Now at the Mayall: Mayall z-band Legacy Survey

- DESI footprint at DEC > +30 deg
- Depth: z=23.0 5-sigma point source
- Coordinate footprint with Bok g/r survey
- ~220 nights total with Mayall in 2016A and 2017A semesters
- **Data public immediately (NOAO Science Archive)**



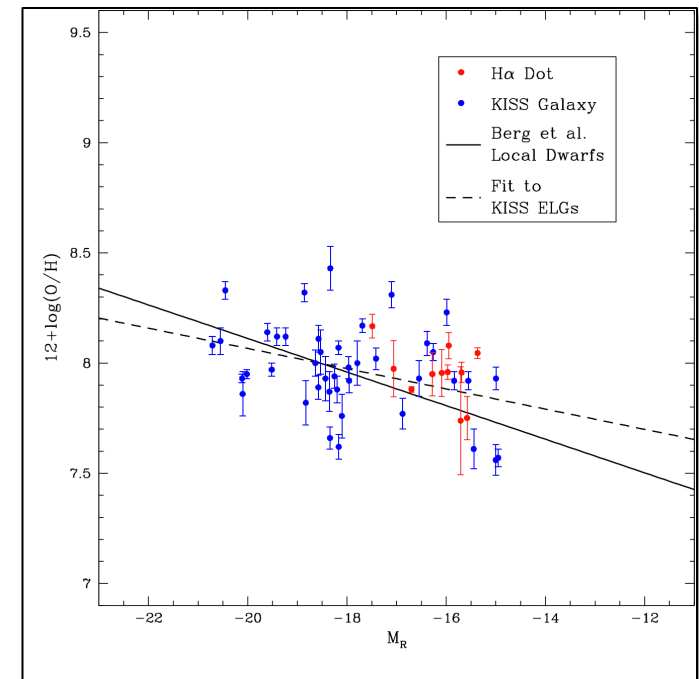
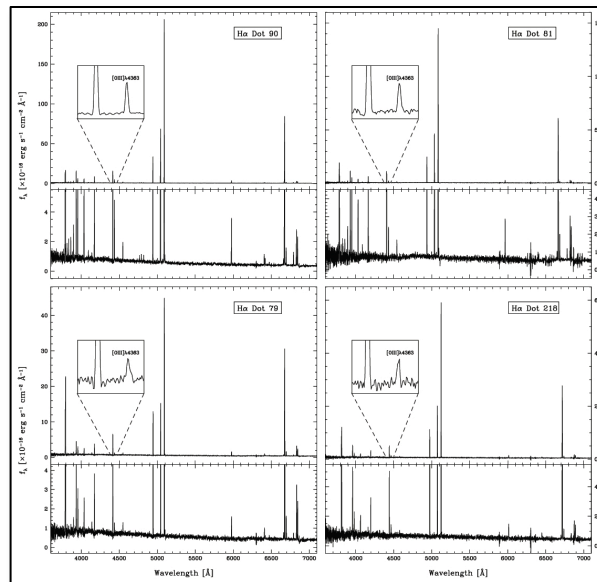
Instruments @Mayall through ~August 2017

- Mosaic-3
 - 8k x 8k red-sensitive optical imager
- KOSMOS
 - Single and multi-slit optical spectrometer
- NEWFIRM
 - Wide field infrared imager



KOSMOS

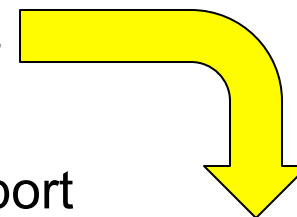
L-Z relation in low-luminosity star forming galaxies (A. Hirschauer)



- Stage 1 (2105B – 2017B)
 - GO program with current instruments
 - NASA will provide GO financial support

WIYN 3.5-m

- Stage 2 (2018A – TBD)
 - New instrument for precision radial velocities
 - Kepler/K2 and TESS follow-up
 - GTO/GO programs with NASA financial support



❖ Extreme Precision Doppler Spectrometer (EPDS)

Facility instrument

Requirement: < 50 cm/s (goal: ~ 10 cm/s)

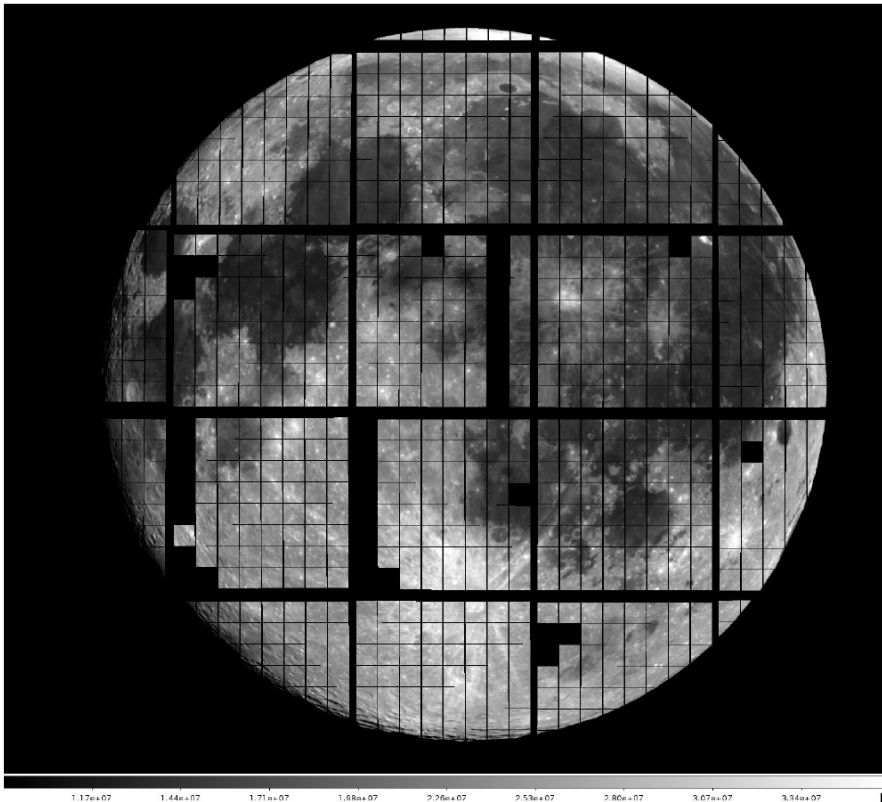
NASA-funded, community-built

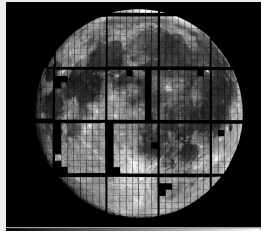
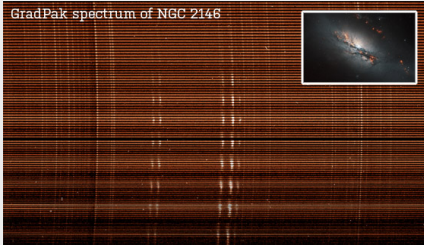
AO released: January 2015

Selection: March 2016

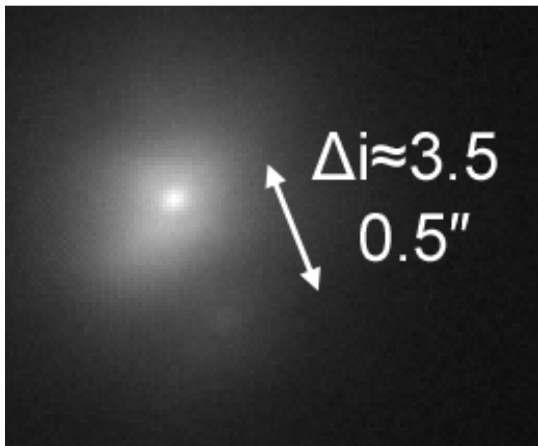


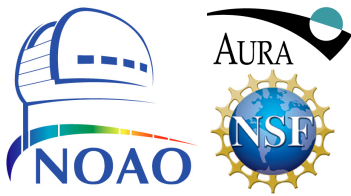
- ODI upgrade completed
 - Focal plane expanded from 24'x24' to 40'x48'
 - Filter arm drive mechanisms replaced
 - U band filter obtained



Imaging	Spectroscopy
<p>One Degree Imager “ODI” 0.1” pixels; 40’x48’ fov SDSS u’, g’, r’, i’, z’ filters Science pipeline</p> 	<p>HYDRA ~100 fibers red or blue; ~1 deg fov Feeds bench spectrograph Data reduction cookbook</p>
<p>WIYN High Resolution Infrared Camera (WHIRC) 0.1” pixels; 3.3’ x 3.3’ fov J,H,K + 10 narrowband filters WIYN Tip-Tilt Module (WTTM) = fast guider Data reduction cookbook</p>	<p>IFU modules Visitor Instrument (M. Bershadsky, P.I.) SparsePak, GradPak, HexPak Feeds bench spectrograph</p>
<p>Differential Speckle Survey Instrument (DSSI) Visitor Instrument (E. Horch, P.I.) Simult. 2-band, diffraction-limited images V~15, 0.05” resolution (650nm), 2.8” fov Queue mode + science pipeline</p>	<p>Bench spectrograph R = 800 – 20,000 $\lambda\lambda = 300 – 1000 \text{ nm}$</p> 

- Robotic UV laser SCAO system on KPNO 2.1m
- Caltech/Hawaii team
- Diffraction-limited surveys
 - Kepler/K2 follow-up, stellar multiplicity, lensed quasars, asteroid binarity
- Community access likely in 2016B






Outreach

- Kitt Peak Visitor Center
 - Up to ~40,000 visitors annually
 - Daytime & night time programs



Sections 

The Washington Post



Sign In

Travel

Arizona's Kitt Peak Observatory offers a perfect sight-line to the stars



AAS January 2016



The Runner 50 Cents

Volume 21 Number 11 Sells, Arizona 85634 June 4, 2014 - Page 1

O'odham teenagers want to learn about outer space at Kitt Peak Astronomy Camp

Kitt Peak: "To explore strange new worlds...to boldly go where no man has gone before." Well in this case, it's not the fictional Star Trek crew exploring the farthest reaches of the galaxy on the starship Enterprise, it's four young Tohono O'odham girls exploring the darkest reaches of the universe through the use of science and a variety of telescopes during this summer's Astronomy Camp held at the Kitt Peak National Observatory from June 3 to 9.



Tohono O'odham teenagers are eager to learn as much as they can about outer space and galaxies at astronomy camp atop Kitt Peak. Hazel Capis, 13, left, and Katelyn Sogonda, 12, are inside a telescope facility at the mountaintop observatory. The Runner photo.



Shilena Anandachin, left, and Shilena Casanova-Rodriguez, both 13 years old, have been curious about space and astronomy since they were very young children. They look forward to confirming their theories about space during the astronomy camp. The Runner photo.

Dr. Don McCarthy, astronomer and the camp's director, is excited for the 31 students, all between the ages of 11 to 15, to get their hands on a real-world science experience.

"I think what Astronomy Camp does, is it merges everything. It merges science, art, and even art. It shows how all these things are part of a whole, not separate topics," said McCarthy.

"(The students) will also be learning how to operate telescopes and digital cameras. They will measure and track asteroids as well as take color pictures of nebulae and galaxies they are interested in," McCarthy said. The students will also have the unique experience of using Kitt Peak's 90-inch telescope on June 7, he said.

Aside from studying the heavens, students will also be able to take part in science debates and hands-on building projects, McCarthy added.

The 31 students, who hail from all over the United States, United Kingdom, and Mexico, will be living, eating and sleeping together on top of Kitt Peak for a week. Of the 31, four are Tohono O'odham girls who will be taking part in the camp for their very first time.

Hazel Capis, 13, who just became an eighth-grader at Safford Magnet School in Tucson, said that she joined the camp because she thought it would be a fun way to learn about astronomy.

"I want to learn more about the universe, stars and planets," Capis said.

See Teen astronomers...Page 8

Sells: During the holiday holiday of mid-December 2012, a number of Tohono O'odham were greeted to the welcoming surprise of \$1,000 checks in their mail boxes. This money, which came from the Indian Trust Settlement fund as a result of the class-action lawsuit Cobelli v. Salazar, was to be the first of two payments. As of today, according to the Department of the Interior, almost all first-stage payments have been made.

"Over 99 percent of all living Historical Class Member payments have been distributed... (and there are) approximately 38,500 deceased Class Members with awards that have not yet been distributed," the Interior Department said in an issued statement.

However, the second-stage of the payments, which were to be delivered to members of the settlement's Trust Administration Class by late 2013, have still not been sent out.

Gardex City Group (GCG), the court appointed Claims Administrator of the settlement, said the second-stage payments would be made by late 2013, however, according to an employee of the group, they have not yet received the exact date the disbursement of the checks will be made, only that it will be sometime this year.

The GCG employee also said that the Trust Administration Class payment checks are expected to be mailed out within 90 days after the following occur: They are waiting for the membership of the Trust Administration Class to be finalized, the final determinations of eligibility to be concluded for all appeals, and for the court to approve the second-stage distribution.

Because of the year-long delay in the Trust Administration Class's check disbursement, frustration has been growing within Native communities across the U.S.

One such instance involves two U.S. Senators, Sen. Jon Tester (D-Montana), and Sen. John Walsh (D-Montana), sending a letter to Jennifer M. Keough, Executive Vice

President and Chief Operating Officer of the Gardex City Group on April 3, expressing concerns over missing their scheduled payments.

The letter begins, "As Montana's Senators, we are honored to represent a large constituency of Native Americans who are beneficiaries of the Cobelli v. Salazar settlement."

"Our constituents have shared frustrations that final payments from the Settlement have not been completed in a timely matter." The letter continues, "We are deeply concerned with reports that Gardex City Group has missed every scheduled payment date this year."

In an effort to assuage the Native community's frustrations, lawyers David Smith and Bill Morris, of the law firm Kilpatrick Townsend & Stockton LLP, and Class Counsel in the Cobelli v. Salazar lawsuit, wrote, "Please be assured that the Court, the Claims Administrator and Class Counsel are taking all measures necessary to make sure the Trust Administration Class payments are distributed as quickly as possible."

The letter continues, "In particular, frustration has been expressed with the Claims Administrator, the Gardex City Group (GCG), suggesting it is responsible for the payments not having been mailed. GCG, just like the parties, is required to follow the terms of the Settlement Agreement approved by Congress and the Court, including the timeline set forth in that agreement for mailing of Trust Administration Class payments."

The letter goes on to say that the GCG had no control over the delays, which were in fact, caused by two separate events.

First, implementation of the settlement was delayed for a year while Congress considered how it should be implemented. And second, another year-and-a-half went by while four individuals appealed the District Court's order approving it.

see cobelli payouts...Page 5

Outreach

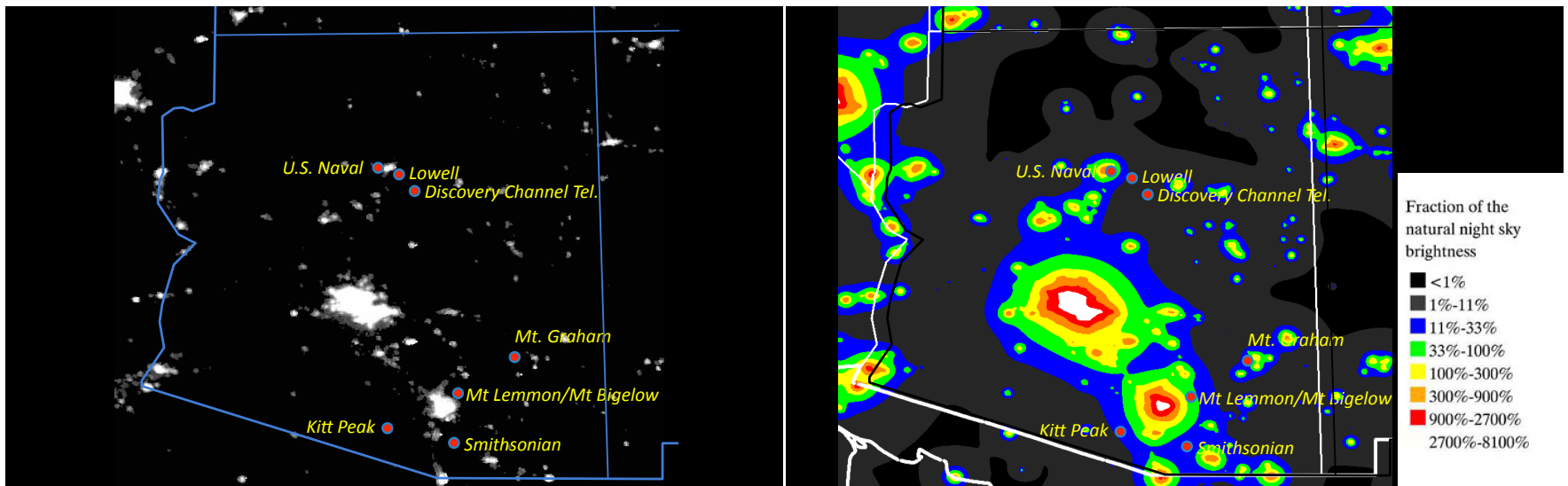
- School groups, day & overnight
- Astronomy Camp (D. McCarthy)
- Undergrad course (S. Oey)



[A. Carillo, Mercury, Autumn 2015]

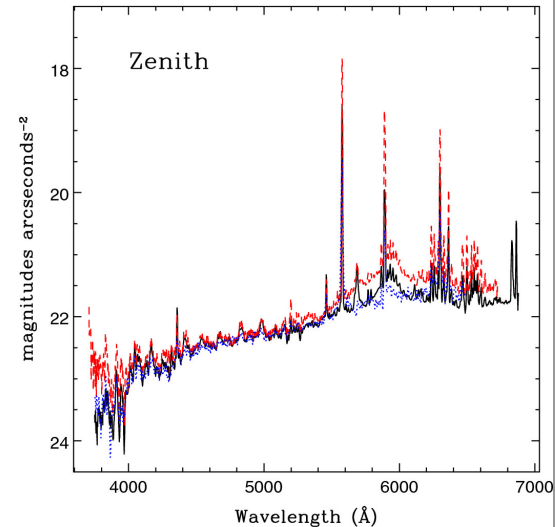
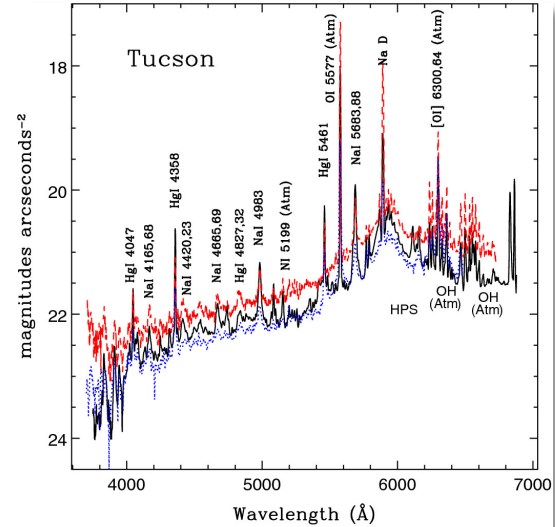
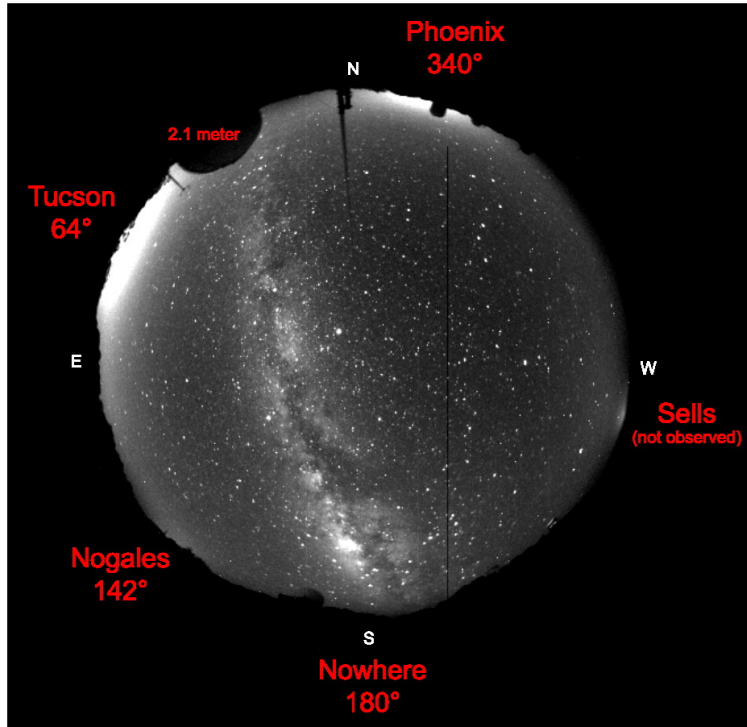
Dark sky protection

- APSS: Astronomy, Planetary and Space Sciences in Arizona
 - AZ observatories joining forces, sharing resources
 - Work with cities and counties to update Outdoor Lighting Codes
 - Track legislative efforts to repeal regulatory statutes (e.g. LED billboards)
 - Track development plans for new industrial and residential sites
 - Produce educational materials



Dark sky protection

Dark @zenith (Neugent & Massey 2010)





2016B proposals due 31 March
<http://ast.noao.edu/observing/proposal-info>

