

The LICK OBSERVER



THE LICK OBSERVATORY AGN MONITORING PROJECT 2011

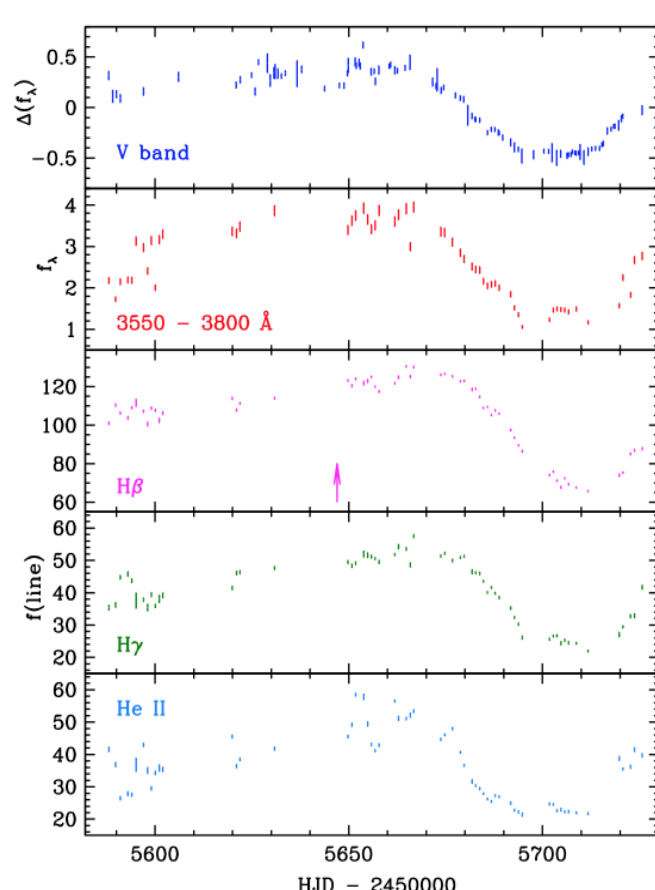
by AARON BARTH (UC IRVINE)



From late March through mid-June 2011, the Lick AGN Monitoring Project (LAMP2011) team executed a 69-night reverberation mapping campaign at the 3-meter telescope, targeting a sample of 14 low-redshift active galactic nuclei (AGNs). Reverberation mapping measures the size and structure of the broad-line region using the time delay between AGN continuum variations and the emission-line response. By resolving the velocity-dependent structure of the Balmer-line variations with high-cadence monitoring and high signal-to-noise observations, it is also possible to obtain information on the kinematic structure of the broad-line region. Spectroscopic observations were done with the Kast spectrograph, and V-band photometric monitoring was obtained from several robotic and queue-scheduled telescopes including KAIT at Lick. The LAMP2011 team includes astronomers from six UC campuses, as well as Lick Observatory, JPL, and other partners.

Data reduction and analysis of the large LAMP2011 dataset is ongoing at UCI and UCSB. The LAMP2011 campaign's first pub-

lished results provide measurements for the galaxy Markarian 50, which exhibited extremely strong variability during the monitoring period, resulting in data quality on a par with the best reverberation observations from previous campaigns. Barth *et al.* (2011, *ApJ*, **743**, L4) measure the velocity-resolved reverberation response and provide a virial estimate of the black hole mass. Pancoast *et al.* (2012, *ApJ*, in press) apply new dynamical modeling methodology to directly constrain the black-hole mass independent of prior assumptions about normalization of the AGN black-hole mass scale.



Reverberation mapping data for Markarian 50. From top to bottom, panels show the light curves of the V-band continuum measured with image subtraction photometry, the U-band continuum measured from Kast spectra, and the H β , H γ , and He II 4686 emission lines measured from the Kast data. The arrow in the H β light curve shows the start date of the LAMP2011 campaign; other observers have generously provided the earlier data, from observations acquired during their own Kast nights.

ANNOUNCING THE "FRIENDS OF LICK OBSERVATORY"

UCSC Chancellor George Blumenthal has approved the formation and initial bylaws of the Friends of Lick Observatory, a group formed to provide financial and other support for various programs at Lick Observatory, including development and maintenance of educational programs, exhibits, facilities and volunteer programs.

Friends of Lick Observatory seeks to build public awareness of the observatory's education programs and events. It will promote and raise funds in support of activities that enhance public awareness and support of Lick Observatory, including its astronomical research, rich history, and natural surroundings.

The Friends also aims to stimulate young peoples' interest in astronomy, and encourage them to pursue scientific careers. Moreover, we will strive to provide a forum for astronomers to present their endeavors and

discoveries to the community.

Friends of Lick Observatory will sponsor an extensive volunteer program, giving diverse community members an opportunity for service in an accessible university setting. The existing Lick Observatory volunteer program, which was launched in 1997 with the Halls Valley Astronomical Group, will become the foundation for the Friends volunteer program.

We expect the organizational infrastructure to be in place by June and plan to announce and commence our first membership drive on Tuesday, June 5th, during the Transit of Venus event the observatory will be hosting for amateur astronomy groups and the media. Look for more details in the April issue of *The Lick Observer*.

~John Wareham



Friends of Lick Observatory Planning Group. Clockwise from left: LO's Patrick Maloney (mostly out of the picture) and Ron Brimont, UC Santa Cruz Director of Stewardship Sarah Schuster-Kudela, LO's Patricia Madison, UCSC Executive Director of Development Lynne Stoops, UCO Assistant Director Maureen McLean, LO Deputy Director John Wareham, UCO Research Astronomer Bob Kibrick, Michele Kibrick, UCO Director Mike Bolte. Taking photo: Paula Towle.

NEWS FROM MT. HAMILTON

by DEPUTY DIRECTOR JOHN WAREHAM



Facility Improvements

Several of our most historic structures recently received well-deserved facelifts. The Main Building, 40-inch Nickel Dome, Lab and Measurement Building and front entrance to the 3-meter Shane Dome were all resurfaced. Extensive repairs to rain gutters and the 3-meter dome steps will help preserve these renewed surfaces for years to come. These projects were funded entirely through donations received from the general public over the past ten years.

Enhanced Security

Automated security gates have been installed at all observatory access roads leading from Mount Hamilton Road. This will serve to reduce the incidence of trespassing and provide an additional level of security for observatory personnel and assets. Installation of such gates was recommended in the Lick Observatory Security Assessment performed in Fall 2010 by the Kroll organization. The security assessment and resulting initiatives and improvements were funded by the UC Office of the President.

Bandwidth Improvements

Lick Observatory's internet bandwidth will soon increase by about twenty-fold. Installation of a pair of four foot diameter parabolic antennae, one mounted to the side of the 3-meter dome and the other on the roof of the UCSC Extension building in Santa Clara, is scheduled to occur in April. Installation will be followed by a period of calibration and testing. The new system is expected to go live this spring.

This new 11GHz radio link will deliver bandwidth of at least 100 Mbps. The observatory currently shares bandwidth with UC's Blue Oak Ranch Reserve on four leased T1s telephone circuits that provide 5.5 Mbps internet bandwidth.

THE OBSERVER IS LAUNCHED

Welcome to the inaugural edition of *The Lick Observer*, intended to showcase the perennial Lick Observatory—the forefront research that takes place here year after year, the innovative research opportunities that could not have been envisioned even a decade ago, and the committed and talented people who make the machines and instruments ready to serve up the next "World's First" in ground-based astronomy. We hope you'll find it interesting and informative, and that you'll share it with your colleagues in affiliated departments and at other institutions.

Mike Bolte
Director
UC Observatories

John Wareham
Deputy Director
Lick Observatory

J. Xavier Prochaska
Associate Director
Lick Observatory

LICK OBSERVATORY'S PUBLIC SUMMER PROGRAMS



MUSIC OF THE SPHERES

Lick Observatory's Main Building resounds with an eclectic line-up of contemporary musicians on six Saturday nights each summer, during the annual benefit concert series—Music of the Spheres. Concert-goers also hear a talk by one of UC's world-renowned astronomers, and view the night sky through the Great Lick 36-inch refracting telescope and the 40-inch Nickel reflector. Make a note of these dates and artists: June 16, Singing Strings Trio; June 30, Strings of Fire; July 14, Tingstad & Rumbel; July 28, High Land Way Duo; August 11, Kirk Riback Jazz; August 25, Great Guitars. All proceeds help fund the observatory's public programs. Tickets go on sale April 2. Call (831) 459-2159 or go to SantaCruzEvents.com.



SUMMER VISITORS PROGRAM

On six Friday evenings each summer, the public is invited to view the sky through the Great Lick Refractor and the 40-inch Nickel Reflector, and attend a talk about the history of astronomy and Lick Observatory. This year's dates are June 15 and 29, July 13 and 27, August 10 and 24. Tickets go on sale April 2. Call (831) 459-2159 or point your browser to SantaCruzEvents.com.

BURT JONES RETIRES

On October 27, 2011, Lick Observatory hosted a retirement luncheon for Burt Jones, in the Main Building. Burt was UC Observatories' Associate Director from 1996–2011. His career with Lick Observatory spanned five decades, beginning with a postdoc, awarded in 1970. He is pictured here (first row, center left) with his co-workers and colleagues from Lick Observatory and UCO.

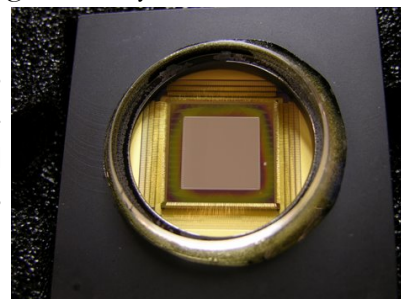
The capital costs and a portion of the installation costs are being funded by an NSF cyber infrastructure upgrade grant (administered by UCOP) using stimulus funds appropriated by the American Recovery and Reinvestment Act (ARRA). Remaining costs are being funded by UCO.

Project manager Bob Kibrick and his team are to be commended. Bob has overseen every detail of this complex project from its conception, through design, FCC licensure, testing, and completion.

THE SHANE AO PROJECT

Nearing its final design, this NSF/MRI-funded project will greatly advance the 3-m telescope's Laser Guide Star system. Led by Don Gavel of UCO's Laboratory for Adaptive Optics and UCO Associate Director Connie Rockosi, the team has acquired its high performance micro-electromechanical (MEMS) device. In addition, Lawrence Livermore National Laboratory is set to deliver the laser by March. Upgrades to the telescope will begin shortly thereafter.

One of the Shane AO Project's micro-electromechanical deformable mirrors (MEMS)



The new system will improve the delivered Strehl in J, H, and K bands by more than a factor of 2, give significant Strehl into the optical (following on the successes of the ViLLaGEs project), and improve the point-source sensitivity by more than an order of magnitude. The project also will include an infrared detector upgrade for the IR instrument to take advantage of the diffraction limit down to the J band, with much higher quantum efficiency. The entire system is expected to be on-sky in 2013. -DG



Lick Observatory's Main Building, finished in 1888, gets a fresh coat of paint.

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Published quarterly in January, April, July and October

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If you have ideas for what you'd like to see included in *The Lick Observer*, please email wareham@ucolick.org or xavier@ucolick.org to have your suggestion considered