AUTOMATED PLANET FINDER (APF) BAGS FIRST PLANETS

By Steven S. Vogt • UCSC Astronomer

The first planets discovered using data from the Automated Planet Finder (APF) Telescope are described in a paper, reported in a recent publication, that was authored by the Lick-Carnegie Exoplanet Team, co-led by Steve Vogt of UCSC and R. Paul Butler of Carnegie.

The first catch was a 4-planet system orbiting the slightly evolved K-type star HD 141399, about 118 light-years away. This system features four giant planets in orbits with periods of 94d, 202d, 29y, and 10y, as shown in top view (red lines) in the figure. This figure also shows (dashed lines) the orbits of our own Mercury, Venus, Earth, Mars, and Jupiter overlaid for reference.

With its three gas giant planets orbiting at distances similar to the terrestrial planets of our own solar system, and an outer 4th gas giant in an orbit similar to our own Jupiter, this system is fundamentally alien. Yet, it is also typical of the sorts of planetary systems found around ~10% of F, G, and K stars. HD 141399 was long suspected of hosting planets from data gathered by HIRES on Keck, but there was insufficient cadence and precision to characterize the multiple orbits securely. APF’s ability to get high precision with high cadence quickly clinched all the orbits, characterizing each with high accuracy. Indeed, the quality of the APF measurements shows that APF is functioning fully as expected, and has, since July 2013, been delivering state-of-the-art radial velocity precision.

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LICK’S STORM PROVIDES NEW MAPS OF GAS SWIRLING AROUND SUPER-MASSIVE BLACK HOLES
By Liang Pei • PhD Student at UC Irvine

The Space Telescope and Optical Reverberation Mapping (STORM) program is an international campaign to obtain the first-ever detailed map of the broad-line region (BLR) of a nearby active galactic nucleus (AGN). Doppler-broadened emission lines of the BLR are emitted by gas orbiting within several light-days around a black hole. The BLR is irradiated by the central black hole accretion disk seen as the spectral continuum. Reverberation mapping uses the time lags between the changes in the continuum and emission lines to characterize the size, structure, and dynamics of the BLR.

STORM’s target is the Seyfert 1 galaxy NGC 5548, which will be monitored photometrically and spectroscopically for six months. UV spectra from an 180-orbit HST program will monitor carbon IV lines from the inner BLR. Over the same six-month span, Lick will monitor the changes in the hydrogen-beta line which comes from the outer BLR by securing optical spectra from the Kast Spectograph on the 3-m Shane telescope. For each dark run from February to July of 2014, each group of regularly-scheduled Kast observers is taking two observations of NGC 5548 each night. This interrupt-mode of observing gives Lick Observatory the unique ability to provide observations for a long monitoring campaign for Lick astronomers and by providing technology proof for the next generation of Keck AO instruments.
2014 PUBLIC PROGRAMS AT LICK OBSERVATORY

In the 126 years since its inauguration, Lick Observatory has continued to offer the public opportunities to visit, observe through its telescopes, and share an understanding of our wondrous Universe. Thus, in addition to its pedigree as an active centre of forefront research and development, Lick is a pioneer of science outreach. This summer will see those traditions continue as the public programs of this iconic San Francisco Bay sentinal welcome thousands of participants to its beautiful mountaintop setting.

Summer Visitors Program
Every second weekend between Memorial Day and Labor Day, renowned astronomers will speak about astronomical discoveries, ancient, modern and those yet to be made. Experienced and informative volunteers and staff offer myriad views of interesting objects through a range of telescopes, tours of the night sky and indispensable advice. Among the many highlights are views through the research-class Nickel Reflector telescope and the world-famous Great Lick Refractor telescope.

Additionally, on Friday and some Saturday nights, the Summer Visitors Program includes an additional speaker, telling the entertaining story of how James Lick circuitously became California’s wealthiest man and why his observatory has always enjoyed global recognition. Tickets (starting at $9.50 plus service fee) and information for the 2014 Summer Visitors Program can be acquired via the following URL: [http://www.ucolick.org/public/sumvispro.html](http://www.ucolick.org/public/sumvispro.html)

Music Of The Spheres Program
Alternatively, on selected Saturday nights, attendees of the Music Of The Spheres can enjoy either a Jazz, World Fusion, Celtic or Guitar concert within the magnificent halls of the original building. Tickets (starting at $40.00 plus service fee) and information for the 2014 Music Of The Spheres concerts can be acquired via the following URL: [http://www.ucolick.org/public/music.html](http://www.ucolick.org/public/music.html)

Saturday Stars Program
For groups of 20 to 30 people with a deeper interest in observing, the Saturday Stars Program sets aside a limited number of Saturday nights to observe with both the Great Lick Refractor using its eyepiece and the Nickel Reflector equipped with a CCD direct imaging camera. Further information for the 2014 Saturday Stars Program can be acquired via the following URL: [http://mtham.ucolick.org/public/programs/SaturdayStars.html](http://mtham.ucolick.org/public/programs/SaturdayStars.html)

REPORT FROM LICK OBSERVATORY COUNCIL

In March, Mr. Adam Kablanian became the newest member of the Lick Observatory Council (LOC). Mr. Kablanian is currently the Executive Chairman of PlasmaSi, a startup company focused on becoming the leader in thin film barrier technology for OLED displays, and a board member of Cortex MCP, a startup company developing a new foundational platform for the future of Mobile and Commerce. Mr. Kablanian has numerous inventions, 14 patents granted in the area of micro-chip design, and he is the author and co-author of over 15 technical publications in leading trade journals. A more extensive bio for Mr. Kablanian and other members of the LOC can be found here.

At its March 19 Council meeting, Ms. Debbie Shen, a project manager in the Office of Research and Graduate Studies at the UC Office of the President (UCOP), briefed the Council on the current status of UCOP’s transition study for Lick Observatory. According to Ms. Shen, that study will investigate and report on the current state of Lick Observatory in order to inform decision-makers in the development and selection of a successful transition path for Lick.” The study has compiled over 30 transition options so far. LOC member Jim Katzman, who is the Council’s liaison to the transition study, had a follow-up meeting with Ms. Shen later in March. The Council looks forward to working with Ms. Shen and others at UCOP to secure sources of funding that will ensure that Lick is able to continue supporting UC astronomy research, education, and public outreach functions. ~Robert Kihick

A New Monster Roams Mt. Hamilton

A 45-foot articulating lift. Image Credit: M. Redl

David C. Koo - UCO Astronomer and UC Professor at UC Santa Cruz

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If you have an idea for something you’d like to see included in The LICK OBSERVER, please email your suggestion to koo@ucolick.org

Black Holes from page 1

Through only minimal interruptions to the observing time of other research groups using Shane. Meanwhile, Lick’s robotic KAIT telescope contributes regular photometry from optical images. My thesis contribution to STORM is analyzing optical spectra of NGC 5548 from the Lick 3-m as well the MDM 1.3-m and APO 3.5-m telescopes. My job is to construct light curves to track the time lags between the changing broad-lines (see Figure) and continuum. Combining data into standardized parameters and quality from different telescopes is challenging and requires communication and coordination across multiple campuses and observatories, as well as the willing cooperation of fellow observers.

The results from this collaboration will be the first of its kind, and Lick Observatory’s participation in STORM has brought together observers across multiple UC campuses in a combined effort to further our understanding of the co-evolution of black holes and their role in the co-evolution of galaxies and super massive black holes through cosmic time.

Eugene A. Harlan 1921-2014
AN ICON OF LICK OBSERVATORY

Leaves a Legacy of Science and Stories

Several generations of astronomers who used Lick Observatory from 1960 to 1991 would have encountered one of Mr. Harlan’s most colorful characters - “Gene” Harlan. We are sad to report that Gene passed away March 29, 2014 at the age of 92 years. Another “old-timer” and now-retired staff of Lick Observatory, Rem Stone, shares his personal account of some of Gene’s many contributions to astronomy, his life, and distinctive character. Gene’s obituary can be found here.

Those of us who knew Gene will undoubtedly recall some of his famous and usually hilarious stories and remember him with a smile.

~Rem Stone