



Focal Point



November, 2013

Membership Meeting on Friday, November 15th

The next membership meeting will be on Friday, November 15th at the MAS Observatory, at 8:00 PM.

Dan Fiorino, a PhD graduate student in particle astrophysics at the University of Wisconsin-Madison, will be our speaker. He specializes in cosmic-ray observations and has been working on the High Altitude Water Cherenkov Gamma-Ray Observatory since 2010 and works closely with colleagues on the IceCube Neutrino Observatory. He will talk about the anisotropy in arrival directions of tera-electron volt cosmic rays.



A telescope made of water - Array of 115 water tanks of the High-Altitude Water Cherenkov (HAWC) Observatory as it appeared on September 13, 2013. When completed, it will have 300 tanks. HAWC is at an altitude of 4,100 meters on the flanks of the Sierra Negra volcano near Puebla, Mexico. It is an international collaboration of over 20 institutions in the U.S. and Mexico. In the background is Pico d'Orizaba, a dormant volcano with an elevation of 5,635 meters (the highest peak in North America outside of Alaska). Credit: Benemérita Universidad Autónoma de Puebla

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MAS Membership Renewal

This year the Membership Renewal Notices were sent out via email. Most of the members responded in a timely manner and sent back their Renewal Forms. Thank you for your support!

If you would like to renew now the Membership Renewal Form is available on the last page of this newsletter.

Treasurer's Report

The September Meeting speaker fee and gas for a lawnmower was \$106.18.

The income from Parking donations (\$230), group tour donation (\$50), Membership dues and magazine subscriptions (\$290), Donation Box (\$134), totaled \$779.00.

Currently the checking account balance is at \$4823.81. The Albrecht fund balance 8214.70. The Endowment Fund is at \$86303.23. Investco yielded \$866.34 since July 1, and it is currently at \$8354.83.

Respectfully Submitted,
Russell Chabot, Treasurer

Comet ISON Watch

Comet ISON will reach perihelion, its closest approach to the Sun on November 28th around 1:40 pm CST. At that time it will appear 1° southwest (to the lower right) of the Sun. With the carefully shielded Sun its coma or possibly even some of its tail will be visible.

The mornings before and after perihelion the comet will not be visible. On November 30th the ISON will began its northern trek, that will carry it past Polaris in early January.



This image of comet ISON was taken by our member Dennis Roscoe on the morning of October 1st. At that time the comet was at magnitude 10.88. Since then it brightened to magnitude 6.3.

Meeting Minutes

Held on October 18th at the MAS Observatory, New Berlin.

The meeting was called to order at 8:03 PM by President, Scott Jamieson.

Minutes from the September 20th General Membership Meeting, was approved as read.

The **Treasurer's Report** was read by Treasurer, Russell Chabot. Copy attached.

Observatory Director's Report - Gene Hanson is securing the MAS letterhead which is a requirement for obtaining additional Observatory keys, which have restricted duplication.

Gene is looking for a volunteer to serve as Assistant Observatory Director.

There was no **Correspondence**

Old Business - Scott Jamieson reported that Z telescope right ascension and declination drives are working. A test image was obtained to verify auto-guiding. The next step is to convert the camera to work with a Paracorr field of view flattener, and then to attempt recording a hydrogen-alpha image.

There was no **New Business**

The Program Scott Jamieson showed the first auto-guided image taken through the "Z" telescope.

Scott then described a viewing session through Mount Wilson's 60-inch telescope with a group of fellow astronomy enthusiasts. This telescope is accessible for public viewing by reservation.

The meeting was adjourned at 9:00 PM

Respectfully Submitted,
(Brian Ganiere for) Agnes Keszler,
Secretary

Observatory Events

Progress on Z-scope Rebuilding Project

After rebuilding both right ascension and declination drives, several tests were performed using DSLR camera, where the telescope was able to track objects for a couple minutes without much trailing. On October 27th the first attempt was made to take some images using CCD camera and narrowband filters. The M27 Dumbbell Nebula and The Veil Nebula were imaged by taking 2 min and 5 min frames for M27 and the Veil, respectively.



Above are three versions of the same Dumbbell image where the Hydrogen Alpha, OIII and SII channels were mapped to different colors. The Veil Nebula (lower right panel) was mapped to a more conventional Hydrogen Alpha - red, OIII - blue, and SII - green colors.

In the Astronomical News

HAWC-Eye on the Sky, a Telescope Made of Water

The most violent phenomena in the Universe—blazars and gamma-ray bursts—are in the sights of a brand new wide-field telescope that began monitoring the heavens high in the mountains of Mexico on August 1, 2013.

Called the High-Altitude Water Cherenkov (HAWC) Observatory, the brand new instrument will observe gamma rays (the Universe's most energetic photons) and high energy cosmic rays (protons and nuclei with energies higher than 100 billion electron volts, or 100 GeV). For comparison, visible light at a green wavelength of 532 nanometers has an energy of slightly more than 2 electron volts (2 eV). "The photons we are looking at are 100 billion to 100 trillion times more energetic than visible light," explained Gus Sinnis, the physicist at Los Alamos National Laboratory in New Mexico who is overseeing the scientific analysis of HAWC data. Their wavelengths are smaller by the same enormous factors.

Blazars are active galactic nuclei—supermassive black holes a million times more massive than the sun that generate intense radiation as material falls into them—with jets pointed at us. Gamma-ray bursts originate from a class of supernovae (exploding stars) with jets pointed at us, or from merging neutron stars.

Extraordinary energies call for extraordinary detectors—and HAWC looks like no ordinary telescope. For one thing, it does not form an image, so there are no lenses or mirrors. Instead, the instrument consists of an array of gigantic corrugated steel tanks—each 4.5 meters deep and 7.3 meters across—filled with ultrapure water. At the bottom of each tank are four photomultiplier tubes sensitive to ultraviolet light, one in the center and three more in an equilateral triangle around it.

When such a pancake of subatomic particles sweeps across the array of HAWC water tanks, the charged particles are traveling faster than the

speed of light in water. Thus, inside the tanks, they produce a cone of Cherenkov radiation: mostly ultraviolet light beamed in the forward direction. It is these flashes of ultraviolet light that the photomultiplier tubes detect.

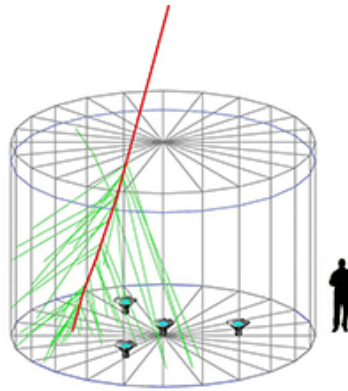
Timing the order in which the photomultiplier tubes detect the Cherenkov radiation to less than a nanosecond reveals essential astronomical data.

For example, gamma rays tend to produce flashes of light that are brightest near the center of a particle shower and decrease in intensity radially, whereas cosmic ray air showers tend to create a messy or blotchy "footprint." And although HAWC observes the entire sky 24/7 and there is no steering or pointing mechanism, it is possible to determine the direction from which a pancake of particles came to within an angular accuracy as fine as 0.2 degree (about half the diameter of the full moon).

HAWC's wide field of view and continuous operation are essential to capture rare, short duration phenomena such as gamma-ray bursts. When all the tanks are completed in 2014, HAWC will detect 20,000 cosmic ray air showers each second, which requires recording 500 megabytes of data each second. HAWC runs continuously, so data are calibrated, reconstructed, and analyzed in real time by a farm of computers at the remote, high-altitude site, sending out prompt alerts to astronomers observing at other wavelengths worldwide in the event of a transient.

—Trudy E. Bell, M. A.

The University of California High-Performance AstroComputing Center (UC-HIPACC), based at the University of California, Santa Cruz, is a consortium of nine University of California campuses and three Department of Energy laboratories (Lawrence Berkeley Laboratory, Lawrence Livermore Laboratory, and Los Alamos National Laboratory). UC-HiPACC fosters collaborations among researchers by offering travel and other grants, and co-sponsoring conferences. More information appears at <http://hipacc.ucsc.edu>.



Each corrugated steel tank in HAWC is 7.3 meters across and 4.5 meters deep. It contains a bladder filled with ultrapure water. At the base are four photomultiplier tubes. This diagram shows a charged particle (red line) passing through a tank and emitting Cherenkov radiation (green lines). Credit: Image created by Brian Baughman of the University of Maryland and Segev Benzvi of the University of Wisconsin.

Adopt a Telescope Program - Signup Sheet

	Adoptee	Scope	Location
1	Sue Timlin	18" F/4.5 Obsession	Wiesen Observatory
2	Neil Simmons	12.5" F/7.4 Buckstaff	B Dome
3	Russell Chabot	12.5" F/9 Halbach	A Dome (Armfield)
4	Dan Yanko	18" F/4.5 Obsession (Kyle Baron)	Albrecht Observatory
5	Tamas Kriska	25" F/15 Zemlock	Z Dome
6	Henry Gerner	12" LX 200	Tangney Observatory
7	Jeffrey Fillian	14" Z-Two scope	Ray Zit Observatory
8	Vacant	10" LX 200	Jim Toeller Observatory

At Your Service

Officers / Staff

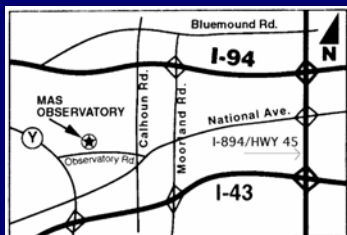
President	Scott Jamieson	262-592-3049
Vice President	Brian Ganiere	414-961-8745
Treasurer	Russell Chabot	414-881-3822
Secretary	Agnes Keszler	414-581-7031
Observatory Director	Gene Hanson	262-354-0138
Asst. Observatory Director	Vacant	
Newsletter Editor	Tamas Kriska	414-581-3623
Webmaster	Robert Burgess	920-559-7472

Board of Directors

Robert Burgess	920-559-7472
Russell Chabot	414-881-3822
John Hammetter	414-519-1958
Gene Hanson	262-354-0138
Lee Keith	414-425-2331
Agnes Keszler	414-581-7031
Tamas Kriska	414-581-3623
Neil Simmons	262-889-2039
Michael Smiley	262-825-3981
Sue Timlin	414-460-4886
Dan Yanko	262-255-3482

September/October Key Holders

11/16	Tim Hoff	262-662-2212
11/23	Scott Jamieson	262-592-3049
11/30	Lee Keith	414-425-2331
12/7	Tamas Kriska	414-581-3623
12/14	Mike Smiley	262-825-3981
12/21	Tom Schmidtkunz	414-352-1674



MAS Observatory

18850 Observatory Rd
New Berlin, WI

www.milwaukeeastro.org

MAS Membership Renewal Form



Please return this form with your payment. We encourage you to join our online community at the **Milwaukee Astronomical Society Google Group**. Please visit our website at www.milwaukeeastro.org

Add my email to the MAS Google Group: YES _____ NO _____

Name:

Address:

City, State Zip:

Phone:

E-mail Address:

Membership (select one of the following)

- _____ \$46.00 - Resident Individual
- _____ \$52.00 - Resident Family
- _____ \$23.00 - Resident Student
- _____ \$28.00 - Non Resident Individual
- _____ \$32.00 - Non Resident Family
- _____ \$20.00 - Non Resident Student

A resident is defined as a person who lives in Milwaukee, Waukesha, Ozaukee, or Washington counties. Non-residents are all other locations. Keyholders must pay resident dues.

Subscriptions

- _____ \$33.00 - Sky and Telescope magazine subscription
- _____ \$34.00 - Astronomy magazine subscription

\$ _____ Total due.

Make checks payable to **The Milwaukee Astronomical Society.**

Please complete and mail form with payment to:

Tamas Kriska
923 Currie Place
Wauwatosa, WI 53213