MHAS-Observer

Newsletter of the McMath-Hulbert Astronomical Society, Lake Angelus, Michigan

Contents

President's Message

Greetings all,

The month of April continues to bring us warmer weather which makes observing Michigan skies more tolerable, however we are losing some night time hours.

Continuing my theme on with amateur contributions to professional astron-omy, let's start with the ability to monitor variable stars, stars that change in brightness. Many stars vary in brightness at regular intervals and are quite well known to astronomers. Some stars become brighter and dimmer at unknown intervals. They have brightened in the past and it is not known when they will dim and then brighten in the future. These are the stars that amateurs can monitor with smaller telescopes and make valuable discoveries. Once a star is found to increase in magnitude (brightness), professional astronomers can be notified so that they can point large telescopes at them.

The process for monitoring these stars is rather easy. You can obtain a list of potential variable stars from the Amateur Association of Variable Star Observers. They have star charts of the location of these stars and all you have to do is use your telescope to see if the star is visible. The stars you try to see should be too faint for your scope to see. However, if the star is visible then that means it has brightened which you then would report your findings so that others can confirm your observation. As I am writing this in March a star has suddenly brightened enough to be seen in binoculars. This only happens once in about every ten years and is visible from the observatory grounds now. Check our Facebook page for the position of this star. Another contribution that can be made by amateurs is accurate brightness measurements using a digital camera or a device called a photometer, something I hope our society can obtain one day.

Also an instrument called a spectrometer, which breaks up the starlight into a rainbow. Using this we can help determine the chemical composition of the star. This is what the observatory was designed to do for the Sun, however we need a more sensitive device to be used on stars.

Another piece of desirable equipment for future fundraising!

Marty Kunz

Corona Virus Update

With the most recent restrictions due to the increase of the Covid infection rate, we unfortunately have to restrict access to MHO again.

We at MHAS are all hoping we can resume normal operations and visits this year with the coming of vaccination. And at the time of this writing there appears to be a de-crease in infection rates.

Henry Schoolcraft Hulbert (1869 -1959)

History Corner—Jim Shedlowsky: Henry Schoolcraft Hulbert, The Judge Who Inspired MHO

On January 24, 1925, three men, acting on the advice of the University of Michigan's Astronomy department, gathered in Geneva, New York to watch the total Solar Eclipse of that date,…in an unusual fashion,…from a hot air balloon. Although the flight was cancelled, and because of bad weather, they did not see the eclipse, this was a fortuitous occasion. The event was organized by Judge Henry Hulbert, who had consulted with his friend Professor Ralph Curtis at the U of M and had invited his longtime friend, Francis McMath, who was accompanied by his son, Robert. This expedition was the first time these three men and the U of M were associated in an "astronomical" venture,…but it would not be their last.

Judge Hulbert had been interested in astronomy since he was a teenager, having built his first observatory in 1887 near the campus of the Wayne State University's campus. He had met Francis McMath early in the 20th century when both men were involved in civic and philanthropic activities. In the early 1920's, when the elder McMath got interested in astronomy, he and Hulbert, and then son Robert McMath began a friendship on that level which rapidly developed over the years.

Henry Hulbert was an influential leader in the southeast Michigan area, a Wayne County judge for nearly 50 years and was in fact Wayne County's first Juvenile Judge having been appointed in 1909, despite the fact that he had no formal legal training, never went to college and had to quit high school at age 15 to support his family. His obituary in the June 5, 1959 Detroit Free Press claimed that "Hulbert's court became one of the most outstanding in the United States and the judge had an international reputation". This background is a testimony to the intellect, personality and leadership abilities which garnered him close friendships with many of the most influential people in the greater Detroit community. These relationships would result in opportunities and support for his astronomical interests, as we shall see.

A good example of how Hulbert was able to use his many talents and "connections" occurred in 1927 when George Booth, the newspaper magnate, was developing the Cranbrook complex as a cultural and educational campus. Hulbert, who was

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a close friend of Booth and a Cranbrook trustee, persuaded Booth to include astronomy in the curriculum of the school…and donated his own 3 inch refractor telescope. When the initial telescope and its arrangements proved inadequate, Hulbert consulted with professor Curtiss (at the U of M) and spent $3,585 to buy a 6-inch refractor and at the suggestion of Francis McMath, enlisted his son Robert to improve the mounting of the telescope. They then convinced Booth to house the telescope in a separate location, whereupon, Booth agreed to build a new observatory including a planetarium and museum, which became the Cranbrook Institute of Science, to be designed by Robert McMath. The observatory was named "the Hulbert Observatory" with Robert McMath and Judge Hulbert named trustees.

The Hulbert Observatory at Cranbrook

And so, all of the elements were there in 1930, for the birth of the McMath - Hulbert Observatory. Robert McMath's interest in photography, both of the McMath's mechanical/technical prowess, the U of M's curiosity in these amateurs and the challenge to do something astronomically "different"….take **movies of astronomical objects**. But it was Judge Hulbert who connected these individuals with the interest of the U of M and provided the inspiration to construct an observatory dedicated to doing just that. The three partners built the initial "Dome" (Tower 1), with their own funds, on property near Lake Angelus, where both Robert McMath and judge Hulbert had homes. MHO had become a reality!

When the University's interest in their activities increased and the worldwide astronomical community became impressed with their accomplishments, they were challenged to engage in larger endeavors, requiring larger and more expensive facilities over the years. It was mainly Judge Hulbert who secured the private funding to finance these expansions, through his connections with (and participation in) such private entities as the McGregor Fund, the Rackham Fund, and others since, at that time, public funding was not available for science ventures. Thus the MHO complex, with its Towers 2 & 3, the McGregor Building and the Vacuum Shed were built largely with funding negotiated and secured by a man, mostly noted for his efforts to reform the Michigan Correction/Penal system.

Thus, Judge Hulbert's contributions to the history of the McMath-Hulbert are profound. It was the Judge who initially amplified the astronomical interests of Francis McMath and then challenged Robert McMath with some difficult technical issues at Cranbrook. Again, it was Hulbert who provided the initial contacts with the University of Michigan, which drew the three of them into the "serious science" world, which led them to real breakthroughs in Solar astronomy. And finally, it was Judge Hulbert's abilities and efforts that financed much of the enterprise.

Thanks, Judge Henry Schoolcraft Hulbert!

Introduction to Radio Astronomy—Radio Jove, Part 2

Last month we described how Jupiter emits radio waves in the high frequency (HF) range of 10-40 MHz. This energy has a peak strength at around 20 MHz and it is strong enough to be received on a small short-wave radio.

The earth's ionosphere normally shields us from celestial radiation below 10 to 15 MHz, so 20 MHz normally penetrates the ionosphere and thus it's the frequency that amateurs usually monitor to detect Jovian emissions.

Jupiter's moon Io has a very significant effect on these emissions by virtue of the ionized sulfur dioxide particles blasted off the surface of Io by volcanoes. These volcanoes are tidally induced by Jupiter's tremendous gravitational field which warps the shape of Io as it orbits around Jupiter every 1.8 days. The amount of material blasted out of Io by this process is about 1 ton per second!

Material that's launched out into the space between Io and Jupiter gets ionized by various processes in open space and the charged particles then travel in spirals along the tremendously powerful Jovian magnetic field lines. Note that Jupiter's magnetic field is *millions* of times stronger than Earth's magnetic field. These spinning electrons radiate radio frequency energy that we can hear on Earth with simple receiving equipment.

The ions following the magnetic fields form a current loop between Io and Jupiter and when this loop is aligned correctly with Jupiter's "hot spot", the emissions spike up and we detect a burst of radio activity.

Radio Jove (RJ) is a project sponsored by NASA and it's intended to be an educational program for students and amateur astronomers. The intent of RJ is to get students involved in the science astronomy, physics and Jupiter itself. The RJ website is:

Radio Jove

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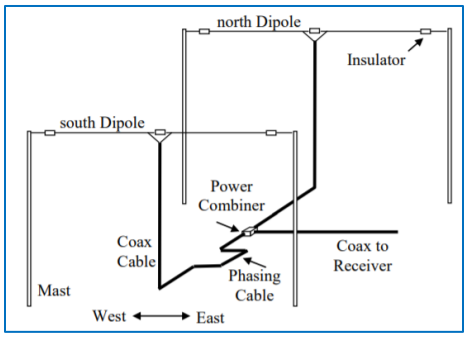


RJ 20 MHz Dual-Dipole Wire Antenna (courtesy NASA)

A typical Radio Jove station consists of a 23 foot long dual-dipole wire antenna tuned for 20 MHz. The antenna is connected by coaxial cable to a receiver operating at around 20 MHz whose audio frequency output is read by a computer sound card.

Many stations use the Radio Jove Receiver that's obtained from the RJ project. A commercial shortwave radio could also be used, but it's important to disable the automatic gain control (AGC) circuit so that a wider range of signal strengths can be monitored correctly in a linear fashion.

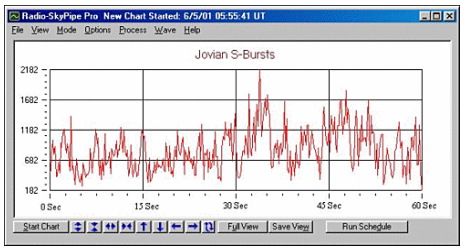
Radio Jove Receiver, Built from Kit (courtesy NASA)

You can listen to the sounds of Jupiter directly by connecting a speaker to the RJ radio. Some of the sounds can be heard here as audio file. Note that L-Bursts and S-Bursts have distinct sounds.

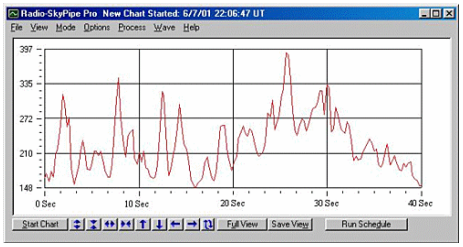
Radio Jove Sound Files

The L-Bursts sound like crashing waves on a beach and the S-Bursts sound like crackles and popping. When the S-Bursts are slowed down, they are heard to be "whistlers". Whistlers are caused by distortions in the speed of the various frequency components in the burst with the higher frequencies travelling faster than the lower frequencies. In a whistler you first hear a high note which then sweeps down to a low note. Free electrons in the space around Jupiter cause this effect.

If the computer is running Radio Sky Pipe software you can see a signal strength versus time display plot on the computer's monitor.



S-Bursts from a Jovian Storm (courtesy NASA)

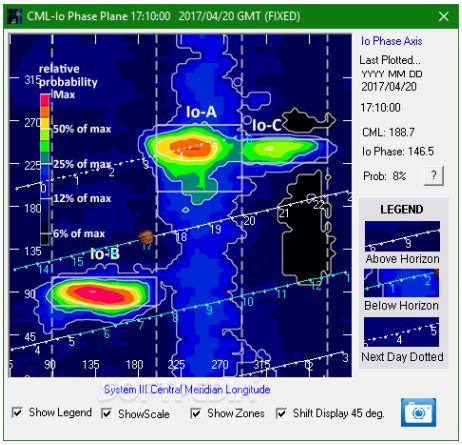


L-Bursts from a Jovian Storm (courtesy NASA)

Radio Sky Pipe is available from Jim Sky's website: http://radiosky.com/

There is another Radio Sky product called Radio Jupiter Pro and it shows predictions of when Jupiter is most likely to burst .You can then set up your equipment to detect it ahead of time.

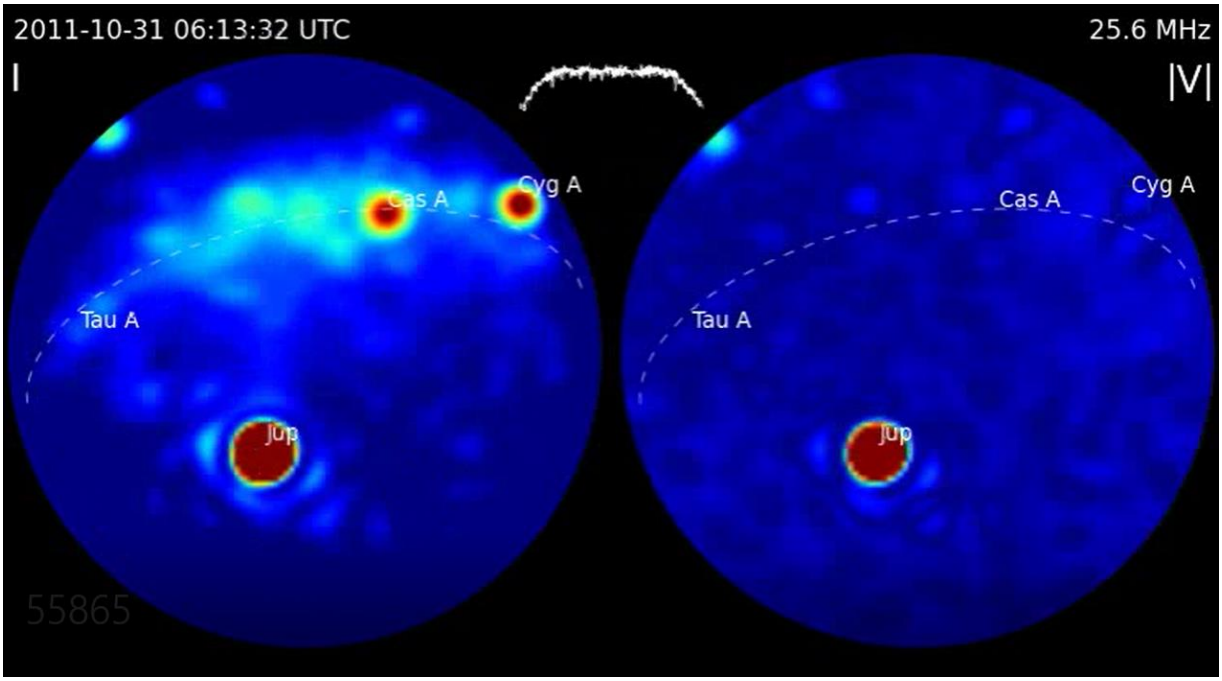
As seen in the shot below, you can set RJ Pro for your location and local time to see when Jupiter may burst. The three main modes (A, B, C) are indicated and the predicted strength is shown too. This is a very useful tool for the amateur astronomer who wants to observe radio bursts from Jupiter.



This software is very useful to let and it's a lot better than just waiting for Jupiter without any indication of when the burst might happen.

We do have an operating Radio Jove setup at McMath-Hulbert and when we are able to have visitors again you can come out and have a look at it.

Next month we'll discuss equipment and techniques that amateur radio astronomers use to detect audio frequency electromagnetic energy in the earth's atmosphere and nearby space



Jupiter's Emissions as Imaged by the Long Wavelength Array in Socorro New Mexico—Observation Frequency is 25.6 MHz with Linear and Circular Polarizations Shown

Spring Has Sprung! Skunk Cabbage Found in the Woods at MHO—Skunk Cabbage Is the First Wildflower Plant to Bloom in the Spring

MHAS Contact Information:

MHAS Website

http://www.mcmathhulbert.org/solar/

MHAS Facebook Page

Click on the button below to get to the MHAS Facebook Page.

Address:

McMath-Hulbert Astronomical Society
895 N. Lake Angelus Rd.
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Email: info@mcmathhulbert.org

Phone: 248-494-8256 (Google Voice, leave message if nobody picks up)

MHAS Officers

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Marty Kunz

Vice-President
Jim Shedlowsky

Secretary
Ken Redcap

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Ken McKenzie

Dir-Communications & Website
Tom Hagen

Dir-Educational Activities
Tom Hagen

Dir-Finance
TBD

Dir-MHO Preservation
TBD

Dir-Buildings Security
TBD

Dir-Social Activities
Marty Kunz

Dir-History
Jim Shedlowsky

ALCOR
Austin Sabatino

Scheduled Meetings

All MHAS members are welcome to join us on Saturday Work Days and Board of Directors Meetings. We are temporarily unable to hold Open Houses for the public.

MHAS Board Monthly Meetings / Teleconferences:

Board meetings are normally scheduled on the 1st Sunday of Each Month @ 7 PM and will be via teleconference. MHAS paid members are invited to participate in this meeting. For an invitation, email us at info@mcmathhubert.org.

Space Pirates Radio!

MHAS President Marty Kunz hosts an astronomy internet show called “Space Pirates Radio" on the website www.astronomy.fm. The show airs every Wednesday night at 9 PM Eastern and features current information about space mission developments, astronomy news, and a “what’s in the sky today” report. Set your alarm today!

Join MHAS

Membership in MHAS is $25/year. Join with us on our mission to preserve and promote the McMath-Hulbert Solar Observatory. Just drop us a line at info@mcmathhulbert.org and we’ll get you signed up! Or use the application form on the next page, print it out, and return it to us via email or USPS.

McMath-Hulbert Astronomical Society

Membership/Donation Form

Name_____

Address_____

Email_____

Phone_____

Date_____

Dues_____Donation_____

Annual membership is $25. Checks should made out to “MHAS” or “McMath-Hulbert Astronomical Society”. You can also pay using PayPal on our website.

Bring to meeting or mail to:
MHAS
McMath-Hulbert Solar Observatory
895 N. Lake Angelus Rd.
Lake Angelus, Mi. 48326