

Gemini

a publication of the Minnesota Astronomical Society



<http://www.mnastro.org>

**June Volume 32
Number 3**

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First Long Lake Outreach Event is a Smash Hit!

By Bill Kocken

This article was originally printed on the MAS Online Discussion Forum. It is repeated here for those of you who are not regular visitors to our web site. -Ed.

Last night was our first outreach event at the Long Lake Conservation Center. We were the honored guests and entertainment at their first-ever "Dinner at the Lake" event. It was a fundraiser for their foundation. They plan to do this twice this year and 4 times per year after this year. Approximately 70 people attended. The event started with people gathering at about 6PM for refreshments and veggies/cheese and crackers. The dinner featured locally grown products. Salad, wonderful fresh local asparagus, baked potatoes and roast beef. Desert was to have been fresh rhubarb but the rhubarb wasn't ready for harvest yet so one of the workers dug into her freezer for local blueberries which were made into a wonderful cobbler.

Greg Haubrich, Ken Hugill, Jim Talbott and I were the MAS representatives. Ken brought his newly finished 12-1/2" Astrosystems DOB for display, along with a 6" that he built a number of years ago. The 12-1/2 generated lots of interest and sparked many good questions from the guests.

After dinner Greg did a presentation about the MAS. I presented a version of Jon Hickman's "Scale of Things" presentation and Ken did a very nice presentation featuring some astronomical sights and information about telescopes. We also answered, or tried to answer, some good questions about astronomy.

One interesting thing we learned is that the area's residents take dark skies for granted and are always amazed at how little of the sky they can see when they travel to the cities!

Unfortunately, the main event, which was to do some observing, was severely curtailed. Most of the people attending were eagerly anticipating this, but the weather didn't cooperate. We did set up Greg's 10" DOB outside of the dining hall and managed to show Saturn to about 15-20 people. The skies were extremely hazy and the only objects visible to us were Venus, Saturn and Arcturus. With the cloud cover and high winds the view of Saturn was quite poor, but as usual, people were impressed to be able to see it's rings.

As a club we've agreed to do 4 outreach events per year at the conservation center. This was the first of them that we have completed. Although we do not have the remaining events scheduled yet and the format may be somewhat different. They will most likely not include a nice dinner, but will probably contain a short introductory presentation with more emphasis (we hope) on observing.

I'd like to thank Greg Haubrich for playing the key role in getting the whole Long Lake Conservation Center deal put together, and Ken Hugill for showing off his new scope and his excellent presentation and Jim Talbott for helping to answer questions and otherwise helping out with the event.

The LLCC is a wonderful dark sky site and I can't wait to get up there again. ■

Position Available for Gemini Editor

Effective Jan 1, 2008 Ron Bubany will be retiring from his position as editor of the Gemini newsletter. This provides an opportunity for someone with the "right stuff" to take over the editorship.

Gemini is the primary communication medium for our society. Although we have email lists and online forums, unlike Gemini they do not reach the entire membership. Gemini does. This function is so important to our organization that it consumes roughly one half of our annual operating budget.

As Gemini editor the successful applicant will assume full responsibility for directing the Gemini publication process, including but not limited to:

- Annually, prepare the Gemini publication schedule including projected issues and estimated costs using the preceding year's schedule as a model.
- Assemble articles for each issue from Special Interest Group leaders, Board members, and the general public.
- Inform all contributors of the deadline date for submitting their content.
- Periodically remind the contributors of the upcoming deadline date so that they will remember to submit their articles.
- Turn over the collected content to our Layout Editor, Brian Litecky.
- Proof and approve the layout for printing.
- Proof and approve copy when it is received from the printer.
- Follow up on the printing status and notify distribution (currently Steve Emert and John Treadwell) that the completed issue is ready for folding, labeling and mailing.
- Submit a completed copy of the issue to the forum web master for inclusion in the online newsletter file.
- THANK contributors for their support of the newsletter.

As you can see, this is a demanding and important position in our organization. At the same time it is very rewarding every time another great issue of the Gemini goes to press.

Interested? If so, please contact our Board of Directors via email at masboard@lists.mnastro.org. If you are successful we can start immediately with on the job training to get the remaining issues out for 2007. Then in January you take over full responsibility.

Congratulations to Katy Haugland, our new Outreach Coordinator

Effective June 1st, Katy Haugland will assume the role of Outreach Coordinator for the MAS.

Katy is currently a student at Macalester College in St. Paul, and a long time member of the Sidewalk Astronomers back in her home state of California. She has been very active with outreach for the MAS during the past two years since moving to Minnesota, and, despite her young age, she has many years of experience in outreach.

Katy displays a wonderful enthusiasm for astronomy, from outreach to ATM to sidewalk events. She is ideally suited to this challenge and will be a most welcome resource for the entire MAS. Join us in congratulating Katy, and offering her a word of thanks for accepting this new role! 🐾

GEMINI INFO

Editors

Brian Litecky
Ron Bubany

Circulation

John Treadwell

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blitecky@yahoo.com
bubanyrc@masrepository.org

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Minnesota Astronomical Society
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P.O. Box 14931
Minneapolis, MN 55414

Send all MAS membership dues, change of address cards, subscriptions and renewals to the current MAS Membership Coordinator. See "How to pay your dues" on the last page of this newsletter.

MAS Officers

President: Ben Huset

E-Mail: benhuset@skypoint.com
651-631-1987

Vice President: Ben Mullin

E-Mail: benjamin.t.mullin@gmail.com
651-784-7469

Treasurer: Bob Benson

E-Mail: rrbsn@earthlink.net
952-937-5451

Secretary: Bill Kocken

E-Mail: wmkocken@hotmail.com
612-554-6712

Board Member: Greg Haubrich

E-Mail: greghaubrich@comcast.net
763-421-4736

Board Member: Ron Bubany

E-Mail: bubanyrc@masrepository.org
320-275-1981

Onan News!

By Dave Olmstead

Most of you are well aware of the many changes at the Onan Observatory over the last two years. We now have what can be considered the best-furnished and equipment-rich club based observatory in the

Midwest and perhaps beyond!

This past winter and spring a newly donated 16" LX200 was added to the observatory. This new visual platform compliments the two Paramount platforms donated in the previous year. Boy, do we have the gear of dreams now! Many individuals have donated their time and talents to provide our new capabilities for public venues and membership usage - thanks to all!

Plans are afoot to add a new driveway to provide easy handicapped access and to provide easy drop off and pick up for individuals bringing their own astro gear. The site plan has been developed and looks great. Board and Onan Committee discussion will follow along with discussion with Carver Parks to make this a reality as soon as possible.

As most of you are aware, the Onan Observatory can only function with the kind efforts of many volunteers. The Onan Committee has recently established a new tiered approach to

getting the job done at Onan. Task Forces are being created which will break down some of the key areas of operation. New "Wranglers" have stepped forward to oversee areas such as computers, astro equipment and video systems.

Russ Durkee is the Computer Wrangler, Kurt Casby is the Equipment Wrangler, and Bob Benson is our Video Wrangler. If a problem, specific question, or a request is on your mind please contact these individuals through the MAS Forums.

Other Wranglers will take care of maintenance and repairs to the Observatory structure and grounds. Lots to do and thanks everybody for your commitment to help!

Training continues for Keyholders and those interested in becoming Keyholders. Thanks to those stepping forward to do this too! Look on the Forums for postings of schedules and sign-up opportunities.

And the best news of all is that the Mosquito Control folks will be treating the Observatory area and surrounds again this year. They did this for us last year and it helped tremendously! Thanks to John

Treadwell for making the calls and making this a reality!

That's about it for now. Clear and skeeterless skies to all!

Dave Olmstead Onan
Committee Chair



Duke Skywatcher



Astronomy Day, 2007

Astronomy Day events were held on Friday evening April 20 and all day Saturday, April 21 at the MAS's Onan Observatory. Thanks to the staffing by numerous Onan key holders, nearly 200 members of the public were able to see wonders of the night sky during the event in spite of cloudy skies and the threat of rain. Many thanks to the key holders who give so freely of their time to staff these events, Onan Committee Members who worked hard to clean and freshen the observatory for our spring and summer season, and especially to Mike Kibat for all his efforts in planning, hosting and working our annual celebration! 📌



Sky & Telescope Subscription Process Change

By Steve Emert

As you know, MAS members get a \$10 discount off the normal \$42.95 annual subscription price for Sky & Telescope magazine, paying only \$32.95 annually for subscriptions to the magazine. Until now, you were required to send your S&T renewal payment to the MAS and we would send in a group renewal on your behalf.

To make the renewal process easier for you, Sky Publishing is now letting you renew directly via mail or phone. You will not be required to validate your MAS membership at the time of renewal; we will validate all membership subscriptions annually with S&T. If you like, you may mail your renewal notice with payment directly to S&T or renew via phone with Sky Publishing at 1-800-253-0245. This new process will especially be of benefit to those of you who wait until your subscription is about to expire before renewing.

NEW! Radio Astronomy Special Interest Group!

By Eric Smestad

I am pleased to announce the re-creation of the MAS Radio Astronomy SIG.

The purpose of the Radio Astronomy SIG is to bring people together who are interested in Radio Astronomy, learn from each other and combine our knowledge and resources to promote knowledge of Radio Astronomy.

You can contact us on the MAS Radio Astronomy SIG forum at

Opportunities at Our Metcalf Observing Site

An anonymous benefactor has offered to gift the MAS with a 10" TMB refractor and mount for installation at Metcalf. The AB stipulates only that the MAS provide adequate housing and security for the telescope and mount.

To that end we need a few motivated individuals to help analyze and upgrade our Metcalf observing site. Here are some of the immediate concerns that need to be addressed:

- Ownership of the property has transferred to the BelWin foundation. While they have made verbal commitments to the MAS that we can continue to use the Metcalf site, a memorandum of understanding will need to be prepared and signed by both BelWin and the MAS describing our continuing use of the site and intent to build an observatory structure.

You will still need to send in your MAS membership renewal to the MAS Membership Coordinator at the MAS Post Office box address, or renew your membership via PayPal.

If you wish, you can still submit your S&T subscription renewal to the MAS when you renew your membership in the MAS, and we will enter your renewal on your behalf just as we always have done.

New subscriptions to Sky & Telescope at the MAS member discount must still be sent to the MAS for group membership subscription processing. Send new subscriptions to the attention of the Membership Coordinator at the MAS at the Post Office box address shown on the back cover of the Gemini newsletter ■ .

<http://www.mnastro.org/forums/index.php>. You can also email esmestad@hickorytech.net. We welcome anyone interested in Radio Astronomy.

The first Radio Astronomy SIG meeting was April 19th. We met at the Bloomington Fudruckers where we talked about radio telescopes, radio meteor observation, satellites and other related topics.

Our next meeting is yet to be determined. Stay tuned to the MAS Radio Astronomy SIG forum for further updates. ■

- We need to resolve where this will be set up, how it will be housed, and all of any other issues that may come up.
- Currently, trees on the property significantly restrict our horizons at Metcalf. BelWin also owns many other parcels in the same general vicinity. A discussion as to an alternate permanent viewing site may be appropriate as part of our negotiations.
- Fund raising for construction costs and ongoing maintenance and operations.

As with any significant challenge this represents a tremendous opportunity for creating a first-rate observing site at Metcalf. If you feel you can help us pull this off, please contact the MAS Board of Directors indicating your willingness to work on the committee. Please also indicate whether you would be interested in serving as committee chair. Email the Board at masboard@lists.mnastro.org today! ■

Astronomy Podcasts Part I

Brian Litecky



Astronomy cast

www.astronomycast.com

Astronomy Cast takes a fact based journey through the cosmos as it offers listeners weekly discussions on astronomical topics ranging from planets to cosmology. Hosted by Fraser Cain (Universe Today) and Dr. Pamela L. Gay (SIUE), this show brings the questions of an avid astronomy lover direct to an astronomer. Together Fraser and Pamela explore what is known and being discovered about the universe around us.



Astronomy Ireland

www.astronomy.ie

Astronomy Ireland is the National Astronomy Club of Ireland (North and South).

Founded in 1990, in 14 years Astronomy Ireland has grown to over 9,000 members, making it the Largest Astronomy Club in the world, relative to population. Our aim is to promote astronomy and space interest and education in Ireland. We achieve this aim by holding talks, lectures, observing sessions and other events nationwide, and through our magazine, Astronomy & Space.

We also run an Astronomy Shop (including Ireland's biggest telescope showrooms) and a telephone news service updated weekly - in Ireland, phone 1550-111-442, or in the U.K. or Northern Ireland, phone 09001 88 1950.

- Astronomy Ireland hosted Ireland's largest telescope event of the year in Roundwood, Co. Wicklow. Photo report [Here](#) - Updates for the follow up telescope session can be found [here](#).
- Astronomy Ireland celebrates 50 years of the BBC's "The Sky at Night" with Sir Patrick Moore OBE



Bad Astronomy

www.badastronomy.com

As an astronomer, teacher, lecturer and all-around science junkie, I am exposed to all sorts of people and their ideas about what goes on in the sky around them. I have been delighted to find that most people are very curious about the night (and day!) sky, but unfortunately a lot of misinformation is spread about astronomy. Sometimes this information is just plain silly, but many times it makes just enough sense that people believe it. Sometimes the news media help spread these ideas (like the one that you can spin or stand an egg on end during the Vernal Equinox), sometimes it's TV and sometimes it's plain old word of mouth, but the misinformation does get around.

I feel obliged to right these wrongs when I can. The Bad Astronomy

web pages are devoted to airing out myths and misconceptions in astronomy and related topics. At the moment, I have no desire to tackle here such thorny topics as astrology, alternate views of the universe that are clearly in contradiction to observations, and the like. I may add something like that eventually, when I have more time (translation: "never").



the British "Naked Scientists"

www.thenakedscientists.com

The Naked Scientists are a media-savvy group of physicians and researchers from Cambridge University who use radio, live lectures, and the Internet to strip science down to its bare essentials, and promote it to the general public. Their award winning BBC weekly radio programme, The Naked Scientists, reaches a potential audience of 6 million listeners across the east of England, and also has an international following on the web.

Each week, listeners of all ages and backgrounds tune in on a Sunday evening to hear creator Dr. Chris Smith, together with his entertaining sidekicks, interview renowned scientists and researchers from all over the world and take science questions on any subject live from the listening public.

In addition to the radio show, the group has organized Naked Science at Borders, a public lecture series enabling the community to attend informative presentations given by some of the UK's most celebrated scientists. They have also put together this website to allow the radio show, lectures, and much more to be accessible world-wide. According to Dr. Smith, the basic goal of the Naked Scientists "is to help people enjoy science as much as we do and, at the same time, to have fun."



Slacker Astronomy podcast.

Slackopedia Galactica is a new community-based multimedia project about astronomy assembled by two members of the Slacker Astronomy podcast and three of their friends.

It consists of an audio podcast, video podcast, collaborative blog, webcomic, discussion forums and a wikipedia-style online encyclopedia. All elements revolve around the world of astronomy told through silliness and humor, while respecting the intelligence of the audience. All of the pieces come together at slackopedia.org, a redirect from and home to the archives from slackerastronomy.org.

The Slackopedia Galactica posse include:

- Michael Koppelman, BS (Cand.) Astronomy, University of Minnesota
- Aaron Price, BS Astronomy, Ph.D (Cand.) Science Education, Tufts University
- Travis Searle, BA Broadcast Journalism
- Rebekah Turner, BS Physics and professional actor
- Dr. Doug Welch, Professor of Astronomy, McMaster University. 🐱

Spectroscopy Corner

By Ron Bubany

In the last issue we introduced the Vspec program, provided you with some references to obtain help files and sample data, and described four techniques for calibrating your spectra from pixels to actual wavelengths. Now that we have that behind us, lets look into using Vspec to obtain some useful information contained within the spectra. In this issue we will discuss using Vspec to identify the elements represented by spectral absorption lines.

Elements absorb light when an electromagnetic particle (photon) collides with an electron and kicks it up from one orbital level to another. Not all light is absorbed, however. For each particular element and each particular orbital level only one specific frequency of the electromagnetic wave will activate an electron and in so doing become absorbed. For example, the following partial table for hydrogen illustrates the frequencies required to bump up an electron from a lower level to a higher level orbit:

Series	Base Level	Next Level	Next + 1	Next + 2	Next + 3
Lyman	Lowest + 0	1216	1026	970	946
Balmer	Lowest + 1	6563	4861	4342	4101
Paschen	Lowest + 2	18751	12818	10938	10050

Add Infinitum

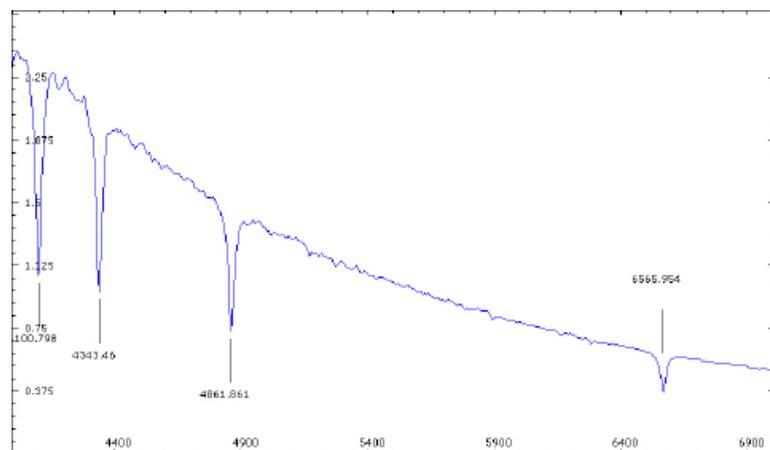
If you want to dig into this more deeply, here is a URL that you might find interesting:

<http://www.chemguide.co.uk/atoms/properties/hspectrum.html>

Only the Balmer series is interesting to us, as that series is the one that we can see in the visible light spectrum between about 4000 and 7000 Angstroms.

So has the light bulb turned on? Have you noticed that each individual atomic element has its own specific set of wavelengths that it will absorb? If we know what that wavelength is, and see a dark absorption line at that wavelength in our spectrum, then we have been able to identify the element as being present in the star's atmosphere.

So lets use Vspec to identify some elements in the spectrum of a



star. First, examine the spectra of a typical class A0 star as it appears in Vspec below.

There are absorption lines at wavelengths of 4100.798, 4343.46, 4861.861 and 6565.954.

We can match these up to a table of wavelength vs. element to see which elements we are dealing with.

Not so fast!

Remember in the last issue how we pointed out that with our amateur equipment we are unable to get to fractional wavelength accuracy? Since our data is not precise, we have to be very careful when we analyze the data to identify chemical elements. The wavelengths we see in Vspec can be considered only as approximations to reality. We must therefore study the element table and try to determine which element(s) we have using common sense, existing reference data, and anything else we can get our hands on that will help us sort this out.

Fortunately, Vspec has an extensive table of wavelengths and associated elements that we can consult. Part of the table is shown below, displaying data for wavelengths around the value of 4861.

We can see that we have iron at 4859.39, chromium at 4861.2, hydrogen at 4861.33 and chromium at 4861.84. Which is it?

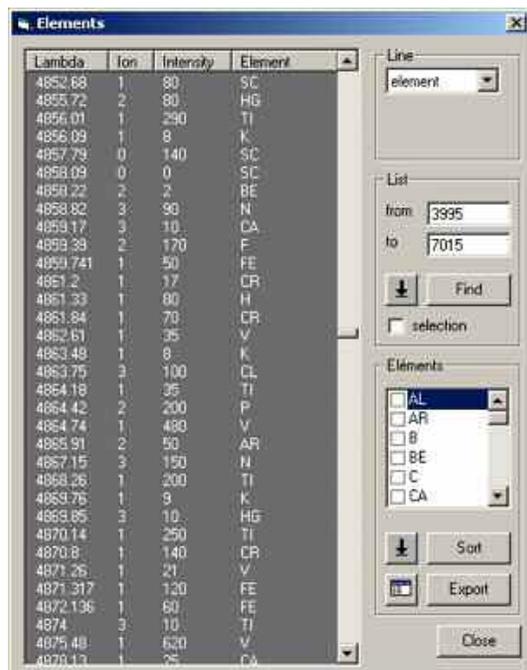
Well we know from Astronomy 101 that hydrogen is the most plentiful element in the universe, so our guess is that this might be hydrogen. To double check we compare the other absorption line values to the Balmer Series for hydrogen. They match up fairly close, so we conclude that we have four hydrogen lines in our spectrum and therefore that hydrogen is a plentiful element in our class A0 star.

To be sure, this was an easy one and other types of stars can prove to be much more difficult! All I can say is that this is as much of an art as it is a science. Go to this URL,

http://www.ras-observatory.org/ras/Observatory/Web_Seminars/web_seminars.html,

and download the file "Amateur Spectroscopy: From qualitative to quantitative Analysis". This file should be extracted from it's zip format and then use your web browser to open the "index.htm" file. Once this is done, you can listen to Dale Mais discuss the art of element identification in great detail.

That will end our session for this issue of Gemini, but stay tuned. I will be back with more in future issues. ■



Onan Public Night Schedule

Public nights are scheduled for Saturdays only. Astronomy Days are Friday evening and Saturday. Public Nights and Astronomy Days are held whether it is clear or cloudy. For Directions to the Onan Observatory, at Baylor Regional Park, please see the Star Party Schedule. For information about the Onan Observatory you can call 952 467 2426.

Date	Starts	Ends	Comments
6/9/07	7PM	10PM	Public Night at Onan
6/23/07	7PM	10PM	Public Night at Onan
7/14/07	7PM	10PM	Public Night at Onan
7/28/07	7PM	10PM	Public Night at Onan
8/11/07	7PM	10PM	Public Night at Onan
8/25/07	7PM	10PM	Public Night at Onan
9/8/07	7PM	10PM	Public Night at Onan
9/22/07	7PM	10PM	Public Night at Onan
10/13/07	7PM	10PM	Public Night at Onan
10/27/07	7PM	10PM	Public Night at Onan
11/10/07	7PM	10PM	Public Night at Onan
11/24/07	7PM	10PM	Public Night at Onan

For maps and further details about the sites, please go to our website at www.mnastro.org/facilities.

Baylor Regional Park

To reach Baylor Regional Park, head west on Minnesota Highway 5, through Chanhassen and Waconia, to the town of Norwood-Young America. Turn right onto Carver County Road 33 and continue approximately two miles north. Baylor Regional Park is on the right side of the road, marked with a prominent sign. When entering the park, stay to the right and follow the road approx 1/4 mile.

When visiting the Baylor Regional Park, MAS members are requested NOT TO PARK OR DRIVE on the grass. There is a parking lot just past the observatory.

For an alternate route from the southern suburbs, take U.S. Highway 212 west to Norwood-Young America. Turn right at the second traffic light onto Carver County Road 33. Continue two miles north to the park entrance.

For an alternate route from the northern suburbs, take Minnesota Highway 7 west approximately 30 miles from I-494. Turn left to go south on Carver County Road 33. Approximately 8 miles south, Baylor Regional Park will be on your left after a short series of curves.

Cherry Grove Observatory

Cherry Grove is located south of the Twin Cities, in Goodhue County, about 20 miles south of Cannon Falls. To reach Cherry Grove, head south on Highway 52. On 52 about six miles south of Cannon Falls, and just past the Edgewood Inn, is a large green highway sign for Goodhue County Rd. 1 "WEST". Turn right, and follow County 1 straight south for about sixteen miles until you arrive at a "T" intersection with County A. The observatory is immediately at your right, nestled in the shoulder of the "T". Parking is permitted on the site or along the road, preferably on County A.

Metcalf Observing Field

To reach Metcalf, head east from St. Paul along Hwy. 94. About four miles east of the I-694 / I-494 crossing is Minnesota State Highway 95, also known as Manning Avenue (exit 253). Turn south (right turn) and then almost immediately turn left onto the frontage road (Hudson Road S). Continue east on the frontage road for about one and one-half miles. Turn right onto Indian Trail, checking the odometer as you turn. Follow Indian Trail south for just about one and one-tenth miles, where you'll see an unmarked and unlocked chain-link gate on the right, opening onto a dirt driveway with a slight up-slope. This is the the entrance to Metcalf.

Long Lake Conservation Center from Western Twin Cities

Take I-94 west to Rogers/MN 101. Go north/right on MN 101 through Elk River, where MN 101 becomes US 169. Continue north on US 169 approximately 90 miles to Aitkin. At stoplight in Aitkin, turn east/right onto US 169/MN 210 and go out of town eight miles. Then turn east/right, following MN 210 toward Duluth. Proceed seven miles. A large green highway sign marks the turn off 210 to Long Lake Conservation Center. Turn north/left on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate.

Long Lake Conservation Center from Eastern Twin Cities

Go north on I-35 to Finlayson/Exit 195. Turn west/left and go one mile to County Rd. 61 and MN 18. At stop sign turn right/north and go two miles. Follow MN 18 west/left and continue 19 miles to MN 65. Turn north/right on MN 65 and proceed 30 miles to McGregor. Intersect with MN 210 and follow 210 west/left (through McGregor) for seven miles. A large green highway sign marks the turn off MN 210 to Long Lake Conservation Center. Turn north/right on County Rd. 5. After three miles, turn east/right on gravel County Rd. 88. It is approximately one mile to the LLCC gate.

Minnesota Astronomical Society 2007 Star Party Schedule

Date*	Special Location	Long Lake Conservation Event	Astronomical Twilight Center Dates**	Moon Begins	Moon Rise	Moon % Set	Illuminated
4-May	Metcalfe			10:22 PM	11:22 PM	6:41 AM	97%
11-May	Cherry Grove		11-May and 12-May	10:36 PM	3:10 AM	2:17 PM	38%
18-May	Onan			10:50 PM	6:39 AM	11:38 PM	3%
8-Jun	Onan		08-Jun and 09-Jun	11:27 PM	1:34 AM	1:21 PM	53%
15-Jun	Cherry Grove		15-Jun and 16-Jun	11:34 PM	5:22 AM	10:18 PM	0%
22-Jun	Metcalfe			11:37 PM	1:33 PM	1:00 AM	47%
6-Jul	Metcalfe			11:29 PM	12:19 AM	12:27 PM	66%
13-Jul	Cherry Grove		13-Jul and 14-Jul	11:20 PM	4:11 AM	8:56 PM	2%
20-Jul	Onan		20-Jul and 21-Jul	11:08 PM	12:24 PM	11:35 PM	31%
10-Aug	Cherry Grove		10-Aug and 11-Aug	10:25 PM	3:08 AM	7:33 PM	8%
17-Aug	Onan		17-Aug and 18-Aug	10:10 PM	11:14 AM	9:57 PM	17%
24-Aug	Metcalfe			9:54 PM	6:18 PM	1:33 AM	80%
7-Sep	Onan		07-Sep and 08-Sep	9:22 PM	2:10 AM	6:08 PM	18%
14-Sep	Cherry Grove	Mini Messier Marathon at CG	14-Sep and 15-Sep	9:07 PM	10:07 AM	8:21 PM	7%
21-Sep	Metcalfe			8:52 PM	4:50 PM	1:00 AM	65%
5-Oct	Onan		05-Oct and 06-Oct	8:24 PM	1:14 AM	4:39 PM	31%
12-Oct	Cherry Grove		12-Oct and 13-Oct	8:11 PM	9:01 AM	6:48 PM	1%
19-Oct	Metcalfe			8:00 PM	3:19 PM	12:28 AM	49%
2-Nov	Onan		02-Nov and 03-Nov	7:40 PM	1:00 AM	3:06 PM	46%
9-Nov	Cherry Grove		09-Nov and 10-Nov	6:32 PM	6:58 AM	4:17 PM	1%
16-Nov	Metcalfe			6:26 PM	12:48 PM	10:28 PM	33%
30-Nov	Metcalfe			6:18 PM	11:24 PM	12:30 PM	63%
7-Dec	Cherry Grove			6:18 PM	5:55 AM	2:48 PM	6%
14-Dec	Onan			6:18 PM	11:16 AM	9:31 PM	19%

* The Onan, Cherry Grove and Metcalfe Star parties take place on the date listed in the schedule above, which is always a Friday. If the event is clouded out, the following night is used as a backup.

** LLCC events are for members only. Vehicle ID card is required - contact Board of Directors or Dark Sky Committee members for a pass.

Due to the relative distance and driving time to LLCC, in 2007 the MAS will include both Onan or Cherry Grove and LLCC parties on LLCC weekends in order to accommodate those who can take the time to travel to very dark skies as well as those who wish to observe closer to home. LLCC weekends will include both Friday and Saturday night.

This schedule is subject to change. You can also check the MAS online calendar at www.mnastro.org/events for a complete schedule of all MAS star parties, Onan Public Observing nights, monthly meetings and other events.

In 2007, daylight saving time begins on March 11 and ends on Nov 4. The times listed above are adjusted for DST.

Onan Public Nights are shown on a separate schedule.



MN ASTRONOMICAL SOCIETY

P.O. Box 14931
Minneapolis, MN 55414

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How to pay your dues

Your MAS membership expires at the beginning of the month shown on your Gemini mailing label. Send your payments to the MAS Membership Coordinator at: Minnesota Astronomical Society, Attn: Membership Coordinator, P.O. Box 14931, Minneapolis, MN 55414. Make checks payable to MAS or you can pay by PayPal on the MAS web page. The current annual membership dues and subscription fees are: \$24 for regular memberships (\$56.95 including a Sky and Telescope subscription discounted to the annual member subscription rate of \$32.95), \$60 for patron memberships (\$92.95 including Sky and Telescope subscription) and \$12 for student memberships (\$44.95 including Sky and Telescope subscription).

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If you get Sky and Telescope at the club's discounted rate, you must renew your subscription through the club. When you get a renewal notice from S&T, send the notice along with a check for the amount indicated on the notice (currently \$32.95) to the MAS Membership Coordinator at: Minnesota Astronomical Society, Attn: Membership Coordinator, P.O. Box 14931, Minneapolis, MN 55414. Make your check payable to MAS. If desired, you may renew your MAS membership at the same time, and write one check to cover both payments.

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The MAS list has about 40% of the membership on it.