

NOVAC

THE NEWSLETTER OF THE NORTHERN VIRGINIA ASTRONOMY CLUB

NO. 104 • VOL. 22 • NOVEMBER/DECEMBER 2002

A brief discussion about nebula filters

by Alan Figgatt

Nebula filters are useful accessories for the seasoned observer. But many beginners or even experienced observers confuse nebula filters with light pollution filters. Common questions are: what does a nebula filter do? Should I get one? If so, should it be a narrowband or an O-III? This article, which grew out of the Sky Tour I presented at the October monthly meeting, presents a very brief overview on nebula filters.

When we refer to nebula filters, it is important to make clear that these filters are not the same as simple color filters, which are used to bring out subtle features in planetary and lunar observing. Broadband and nebula filters are multilayer “interference” filters, which instead filter out specific light wavelength regions as shown in the diagram.

These filters can be broken down into 3 types:

- Broadband /Light Pollution
- Narrowband /UHC (Ultra High Contrast)
- Line: O-III (Oxygen-III), H-Beta (Hydrogen-Beta)

The diagram below (see page 7) shows the typical bandpass of these 3 types. This diagram presents a simplified representation of the filter bandpasses; see the diagrams from the various vendors for specifics on their filter response. The x-axis is the wavelength of light across the visual range from violet (400 nm) to deep red (700 nm). The y-axis is the percentage of the light that the filter passes at that wavelength. The Oxygen-III and Hydrogen-Beta and -Alpha labels mark the emission lines of oxygen and hydrogen.

Filtering light pollution

Broadband filters, which are also called light pollution filters, are not considered to be nebula filters. They have a much wider passband designed to aid with deep-sky observing in moderately light-polluted skies by blocking the most common wavelengths of light pollution—that produced by low pressure sodium and mercury vapor outdoor lamps—while providing for transmission of the rest of the visual spectrum. Broadband filters can help with deep sky observing to some

see “Nebula filters” on page 7

MESSAGE FROM THE PRESIDENT

Winter is a good time to observe

By the time you read this it is going to be cold. Some of the Nomads just curl up and hibernate for the winter. Others of the Ironman type bundle up and go. Check around for cold weather advice from the guys and gals that do the winter thing. There may be more clear nights but along with better transparency



NOVAC President Ed Karch comes poor seeing, as in “twinkle twinkle, little star.” One good thing about cold is that there is no dew, it turns to frost. As Ironman Dietz says “It’s not nice when there is no ice.” (See the Ironman’s tips on page 2.)—Ed. ★

Star Gaze rescheduled for November 9 at Crockett Park

Unfortunately, the Star Gaze could not be held at Franklin Park on October 12 because Loudoun County closed all parks due to concerns about safety. The board has arranged with Crockett Park to hold the Star Gaze at C.M. Crockett park on November 9, which coincides with our public observing night there.

Many of the same events will be held, including speakers, solar observing, hands on demonstrations, and sky tours. Come on out and get ready for winter observing in Virginia! Dress warmly! See www.novac.com/gaze/ for more details.

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Cold weather observing: The Ironman's tips for staying warm this winter

by Tom "Ironman" Dietz

Start with the right underwear

No cotton or polyester/cotton blends next to your skin. This includes underwear and socks. Polypropylene longjohns are excellent provided they're thick enough, arctic-weight wool/polypropylene blend longjohns are even better. Because cotton doesn't wick perspiration away from your skin, it quickly becomes moist and cold in cold weather, leading to rapid loss of body heat. The same property that makes cotton great for wearing in hot weather can contribute to hypothermia in cold conditions.

Dress in layers

Many thin garments with lots of dead air between layers to trap heat are better than a few thick ones. For observing in temperatures below 25 degrees, I generally wear the following:

- Wool/polypropylene or polypropylene longjohns (two pairs for subzero temperatures)
- Polypropylene sock liners
- Wool socks (one or two pairs)
- Flannel shirt (a synthetic fleece shirt would be even better)
- Jeans (synthetic fleece pants would be even better)
- Wool sweater
- Fleece layering jacket
- Down-filled bibs
- Down parka (rated to -40 degrees with the bibs)
- Balaclava
- Wool/thinsulate watchcap

- Wool fingerless gloves
- Pac boots (rated to -40 degrees when the expected low is above 20 degrees or -100 degrees when the low is in the teens or below or when observing on snow)

Always bring more layers than you think you'll need. Add or remove layers depending on air temperature, wind chill, and how much you're exerting yourself. If you're wearing enough to start feeling too warm while you're driving to the site or setting up your gear, you've probably got on too many layers and will get cold after you've stopped moving around as a result of having perspired under your cold weather gear.

Don't put on all of the layers you plan to wear while observing, including heavy boots and socks, until you have everything set up and are ready to observe. On the other hand, if you feel comfortable wearing all of the layers you've brought while laboring to unload equipment and set up, you've probably not brought enough and will start to get cold as soon as you stop moving around.

What to do about cold feet and hands

Cold feet and/or hands are a symptom of a falling core body temperature. When this happens, the brain redirects blood away from the extremities to the vital organs, and the feet and hands become cold. If your core temperature is dropping, the heaviest boots and gloves won't help you feel much warmer. Only adding layers will help.

Drinking something hot will also speed recovery. If you keep your core temperature up, you can often observe in comfort without gloves.

Looser means warmer

In addition to making it easier to move around while wearing multiple layers, loose-fitting clothing will keep you warmer because it allows for more dead air between the layers. Also avoid tight-fitting boots. Even with a couple of pairs of wool socks on,



Thermos, gloves, balaclava, and chemical hand-warmers can help keep you comfortable during winter observing sessions.

see "Cold weather" on page 5

NOVAC

Northern Virginia Astronomy Club 20th Annual Star Gaze

★ Rescheduled ★

Saturday, Nov 9, 2002 • 3 to 11 pm

★ Moved to ★

C.M. Crockett Park in Fauquier County, VA

Speaking events begin at 3:00 pm • Sunset is at 5 pm

Additional information at: www.novac.com

Directions to Crockett Park: From Washington DC/Northern Virginia, go west on I-66 to exit 44 (234 South bypass around Manassas). Take 234 bypass approximately 3 miles to Rt. 28 West. Stay on Route 28 for about 13.7 miles through Nokesville, Catlett, and Calverton. Turn right on Rt. 643 (Meetze Rd.) towards Warrenton (Mayhugh's country store is on the corner). Go on about a mile up Rt. 643 to the park entrance road (Rogues Rd.) on the left. Look for a small sign directing you to C.M. Crockett Park. Once on the park entrance road, go one-half mile to the park gate.

(The 20th Annual NOVAC Star Gaze was originally scheduled to be held on Oct. 12 at Franklin Park, Purcellville, VA. This is the makeup date.)

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Cold weather observing, from page 2

your feet will still get cold if you've cut off the circulation to them by squeezing them into boots that are too small to accommodate the extra socks. I wear a size 10 shoe, but my Pac boots are size 11. A larger size also allows me to place an additional wool inner sole under the boots' inner liner boots. Try on boots and outer layers while wearing the inner layers and socks you plan to wear while observing to find items with the proper fit.

Don't forget your head

Always wear at least one cap in cold conditions. An uncovered head rapidly radiates body heat away. A hood is even better, but often gets in the way. That's why I often wear a balaclava and a watch cap.

Temperature ratings

Temperature ratings for cold weather gear assume the wearer is actively exerting himself/herself. Wearing a parka rated for -40 degrees might seem excessive when it's in the twenties, but experience has demonstrated that additional layers are still needed for a sedentary activity such as astronomy.

Boots rated for -100 degrees are quite comfortable when the temperature is in the

teens or below, especially if you're standing on cold ground or snow, but not if they've become moist from being worn in the car on the way to the site. Always remember to take the liners out of pac boots after an observing session to allow them to dry out, especially if you plan to observe the following night.

Stay hydrated

Keep well hydrated but avoid caffeine. Caffeine is a diuretic and reduces blood volume, making it more difficult for the body to maintain a normal temperature. I usually take bottled water and a half-gallon of decaffeinated coffee with me on cold nights.

Moisturize!

Cold conditions are often very dry conditions. Don't forget the lip balm, etc. I often find that any exposed skin gets dried out during the winter. A little moisturizing lotion when I get back to the house usually helps to keep my hands from becoming too badly chapped.

Chemical handwarmers

Chemical handwarmers are another good item to have, but aren't a substitute for wearing adequate layers of clothing. My parka has

two pockets inside over the kidney area that are designed to hold handwarmers. This is an nice feature worth looking for in a heavy-weight parka. Handwarmers can also be used as eyepiece case heaters.

Stay fueled up

Keeping warm in freezing temperatures requires the body to burn calories at a great rate. Eat well before you head out to observe and bring some high-carbohydrate snacks to stoke the fire a bit during the night. For extended observing sessions during the colder months, a thermos of hot soup can really make the difference between an enjoyable outing and a cold and miserable one.

Car sense

If you have to retire to your car to warm up, please beware of carbon monoxide poisoning. Never sit inside a stationary car with the windows rolled all the way up while the engine's running. Duh. ★

Announcements

NOVAC elects officers in December

John Deriso

At December's general meeting, we vote for 2003 officers. Though we have some volunteers willing to return and some new faces who have offered to step in, all positions are open, subject to membership vote. Nominations (including self-volunteer) are being taken now: email John Deriso at seaotter@bellatlantic.net, or phone him after 7:00 p.m. at 703-476-3543. Our Prez, Ed, has asked for all those who have volunteered to come to the next Board meeting, Tuesday November 5, 7:30 pm at the Arlington Planetarium, 1426 N. Quincy Street, Arlington. This notice will be also posted on the NOVAC email site.

NASM/Einstein Planetarium public observing

2002 Schedule—Sky Meadows State Park, Paris, VA

Join Sean O'Brien, staff astronomer of the Albert Einstein Planetarium, and other local amateur astronomers, for public telescopic observing under dark, star-filled skies, away from city lights. The evening begins with a short night sky orientation at dusk, followed by telescopic observing of various astronomical objects, ending at 11 pm.

Directions to Sky Meadows State Park: Sky Meadows State Park is west of Washington, D.C., on US Route 17 North, 1 mile south of US Route 50, or 7 miles north of Interstate 66, Exit 23. The park contact phone number is 540-592-3556. There is a \$4 parking fee per car. Please cover flashlights with a red filter or a brown paper bag. Dress warmly. In case of clouds or rain, an amateur astronomer will lead a short alternate program.

Date (all Saturdays)	Comments
November 9	2 days before 1st Quarter

Editor's note: This is a fun program for NOVAC members to help out with. Sky Meadows park has great skies, and the public is always very receptive.

The Year-Long Star Party at Spruce Knob

by John Nusbaum

NOVAC is now the proud owner of a brand new, "no frills" star party at the premier observing location in the Eastern US! The Year-Long Star Party (YLSP) is held for 4 nights each month from March through November. The Star Party is held at the Gatewood Group Camping Area just west and slightly below Spruce Knob, the highest peak in West Virginia. Gatewood sits on top of a knoll at 4,338 feet.

The skies at the Year-Long Star Party are truly dark. M33, the face-on spiral galaxy in Triangulum is a naked eye object and the Milky Way stretches from horizon to horizon in both summer and winter! If you have never observed in truly dark, magnitude 7 skies, you will be in for a real treat!

2002 Schedule—Spruce Knob, WV

November 1–4 Friday–Monday nights

The Star Party is free to NOVAC members and there is a nominal cost for non-members.

For more information see the NOVAC website at www.novac.com/spruce or contact John Nusbaum at john@nusbaum.com.

Newsletter now available via e-mail

As an added convenience, members may now elect to receive their newsletter in electronic form via e-mail. The electronic version will be in Adobe PDF format and will typically be 500 to 800 kilobytes. Photos will appear with much better resolution in the electronic copy.

If you would like to receive the newsletter in PDF format, send your name, mailing address, and the e-mail address to which you want the newsletter delivered to mjmills@fpcc.net. Please put "Newsletter PDF" in the subject line. Changes will take effect with the September/October issue. Please note: if you choose to receive the electronic copy, you will not receive a paper copy.

Nebula filters, from page 1

extent, but don't expect them to magically make the sky dark through the eyepiece of a scope. The first key point to remember about filters is that they do not make objects brighter, only dimmer! What they can do is improve contrast, making an object easier to see and often bringing out more detail.

Enhancing nebulae

The second two types in the diagram are what are considered to be nebula filters: narrowband and line. Narrowband filters pass light in a region that encompasses both hydrogen-beta and oxygen-III lines. Some narrowband filters such as the Lumicon UHC and the Thousand Oaks have a hydrogen-alpha bandpass while the Orion Ultrablock does not. Line filters are very narrow filters which pass a specific emission line or set of lines. The O-III filter is by far the most widely used line filter.

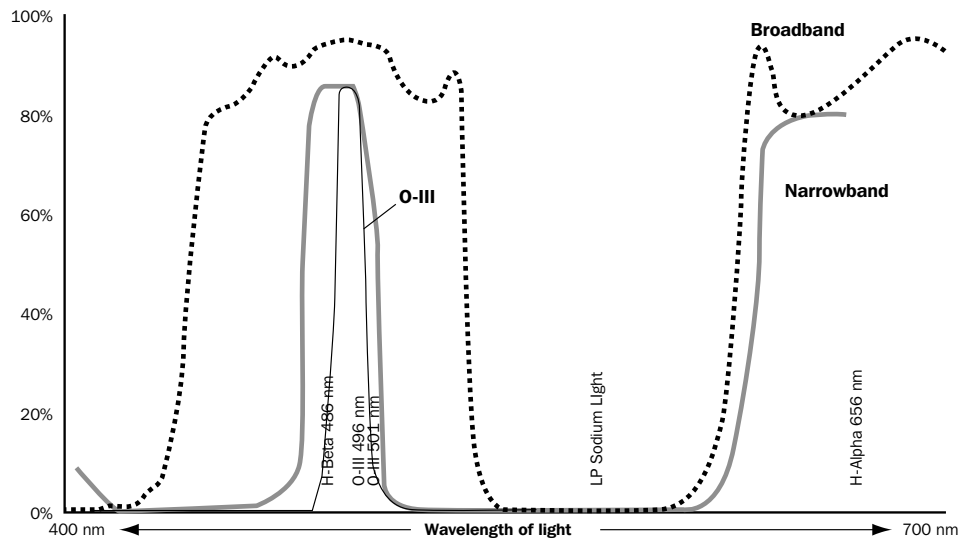
These filters can significantly enhance the visibility of nebulae, as nebulae typically emit much of their visual light as oxygen or hydrogen emission lines. But how well they

The first key point to remember about filters is that they do not make objects brighter, only dimmer! What they can do is improve contrast, making an object easier to see and often bringing out more detail.

work depends on the nebula and the aperture of the scope. For some nebulae, such as the Veil Nebula in Cygnus, a narrowband or O-III filter can make a huge difference in being able to see it. On others, the difference is not as noticeable. Some nebulas will respond better to a narrowband while others, including many planetary nebulae, respond better to an O-III. For beginners,

Bandpass ratios for 3 types of filters

Light passed by filter



the best way to learn about using these filters is to come out to a club observing session and try one.

Narrowband versus O-III

Because these filters can be expensive—typically \$50 to \$100 for a 1.25" filter or \$150 to \$200 for a 2"—a common question is: If I can only get one, should I get a narrowband or an O-III? You will find a difference of opinions on answers to this question. In general, if you have a smaller scope, you may be better off with a narrowband as that will pass more light. An O-III will significantly dim the view and may not be as helpful in a small scope as a narrowband. But this is not a hard and fast rule—I use an O-III in my 85 mm refractor when looking at large nebulae such as the Veil or North American.

For anyone who has a medium to large aperture scope and wants to hunt down planetary nebulae, an O-III becomes a must-have accessory in the eyepiece case. Many observers eventually end up getting both a narrowband, if not several, and an O-III.

Using filters at dark sites

One other misconception that comes up with nebula filters is that they are not needed for true dark sky sites. This misconception presumably arises from the fact that nebula and so-called light pollution filters are frequently lumped together. In practice, a narrowband or O-III filter can be even more

effective at a dark site in seeing faint details of a nebula or observing that very-hard-to-see planetary.

Where to buy them

Lumicon, which was the first company to make nebula filters for the amateur astronomy market and has long been the main brand name for UHC and O-III filters, suddenly went out of business at the end of September. So who are the other sources for nebula filters? There is Thousand Oaks (broadband, narrowband, O-III, H-Beta); Meade; Orion (broadband and narrowband only); and Adirondack Video Astronomy, which sells filters from Astronomik, a German company, which are getting high marks. Another alternative is to look for filters on Astromart.com, an on-line astronomy equipment classified ad site.

As I stated, this is only a brief introduction to nebula filters. For more information, there are some useful websites such as David Knisely's review in the accessory section of www.cloudynights.com. A book on astronomy equipment that includes a section on filters is the recently released 3rd edition of *Star Ware* by Phil Harrington. Another valuable resource is your fellow club members! Ask what filters they use, or borrow one at club observing sessions to try it out in your scope. ★

Meeting highlights

Board Meeting

October 1, 2002

Arlington Planetarium

- ★ The **Leonid meteor shower** is on the night of Nov 18–19. This year, it is a Monday night with a nearly full moon, but a major shower is predicted. Tilly will check to see if we can open **Crockett** for that night and thus designate Crockett as the public site for us to send people too. **Highroad** will likely be available for club members only.
- ★ Tilly is dealing with the tipped-over PortaJohn problem at **Savage Farm**. We have permission to cut down small trees and clear out brush to a limited extent.
- ★ Ways to increase club turnout/support for outreach events were discussed. This is especially important for events held at schools and local parks which are not at our regular observing sites. It was suggested to form an **Outreach SIG**, maybe an outreach committee, to take over for Ed Witkowski.
- ★ Discussed setting up an **official club observing night** once a month to encourage the new members to come out, observe, and get help with their scopes. Agreed to designate the once a month public observing night at **Crockett** as an

official club observing night; with the **Star Gaze** this month, we will start this with the Nov. 9 public night at Crockett.

Submitted by Alan Figgatt

NOVAC Monthly Meeting October 13, 2002

(42 people present)

- ★ **Announcements:** Ed Karch noted 4 first time visitors to the monthly meeting.
- ★ A new **Occultation SIG** (lunar, asteroid, etc.) is being formed, contact Stew via the listserv.
- ★ **Nomination Committee:** John Deriso reported we have several volunteers for the various board openings. Volunteers are still needed for outreach coordination.
- ★ **Powers Mirror:** Mike Mills gave a history on the 34.5" donated Powers Mirror and its various trips to **Newport Glass**. He

showed cardboard cutouts to compare the relative sizes of 8" through 34.5" inch mirrors. After some problems with Newport, the mirror is back there for further grinding to correct a mistake made during the first grinding. Mike hopes to have a large lightweight Dob for serious deep sky observing for the Club to use. No projected time for finishing the project has been established.

- ★ **Sky Tour:** Alan Figgatt covered the main topic of observing in Cygnus and the use of Nebula Filters.
- ★ **Letters of appreciation** were presented to John Avellone from a class of 5th graders to whom he had made a presentation on solar observing.
- ★ Featured speaker **Elizabeth Warner** spoke on the Deep Impact project.
- ★ Meeting adjourned 9:05 p.m.

Submitted by Renée Pleasant.

Upcoming NOVAC meeting programs

Sean O'Brien

November 10, 2002

Buying a telescope • Tom Dietz

Many novice astronomers receive their first telescopes as holiday gifts. Unfortunately many folks buying telescopes during the holiday season lack the knowledge needed to avoid the dreaded "department store trash telescope." If you're planning to buy a first telescope for yourself or as a gift for a loved one, or if you know you will be quizzed by friends and family for telescope-buying advice, come listen to Tom Dietz's thoughts on the subject. There are plenty of decent astronomical telescopes available that won't break the bank, and the "Ironman" will help you find them.

December 8, 2002

Annual club officer elections • Star party reports

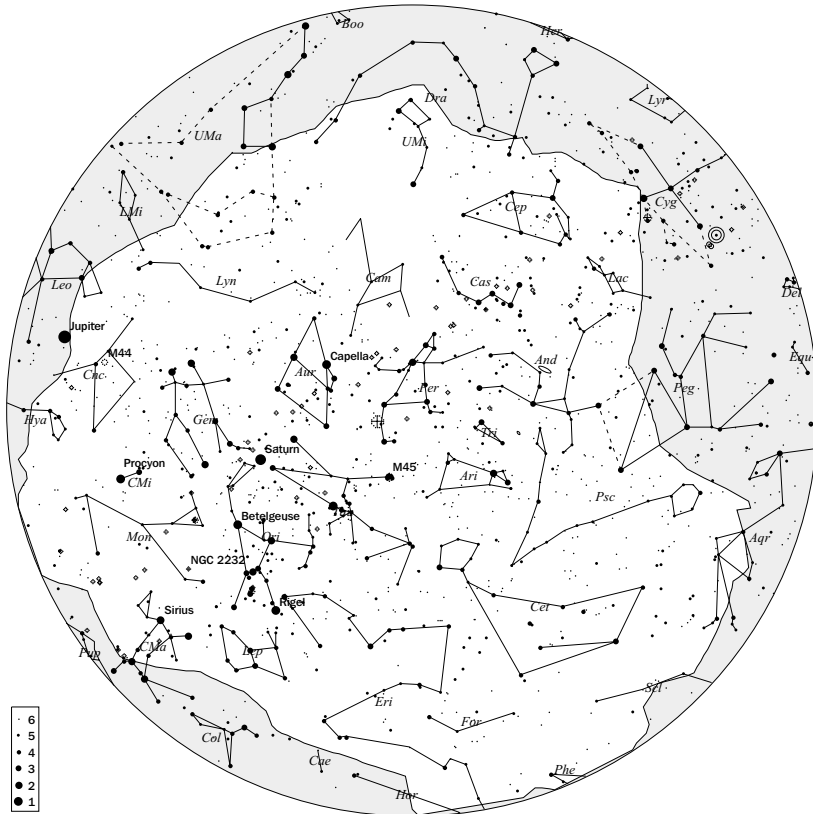
Did you attend a star party this year? Give us your thoughts/observations. Do you have pictures? Show them! Contact Sean O'Brien at SO'Brien@retail.si.edu to participate.

NOVAC meetings are held at 7:00 PM on the second Sunday of each month in Room 80 of the Enterprise Hall at George Mason University in Fairfax, Virginia. See www.novac.com/GMU.htm for a map and directions. **Please note:** The schedule of speakers is subject to change. Please check at www.novac.com/craig/speakers.htm for the latest info prior to the meeting.

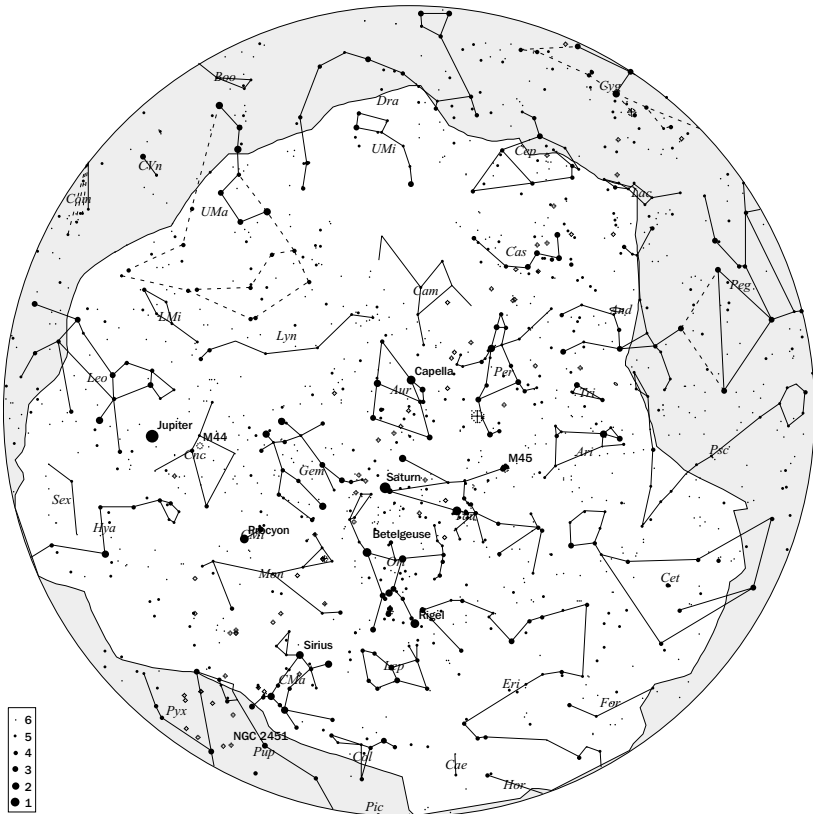
What's YOUR interest? Let SO'Brien@retail.si.edu know. Come share and learn about your favorite topic!



November skies from Savage Farm



December skies from Savage Farm



Jeff's observing report

Jeff Stetekluh

Jeff's astronomical calculations are made for the Northern Virginia area. See www.novac.com/jeff/jrefs.html for calculation references and further details.

Jupiter eclipse events on Friday and Saturday nights

Nov 3	1:43 am	Callisto Eclipse start
Nov 3	6:28 am	Callisto Eclipse end
Nov 9	2:18 am	Ganymede Eclipse end
Nov 16	2:42 am	Ganymede Eclipse start
Nov 16	6:17 am	Ganymede Eclipse end
Nov 22	11:33 pm	Io Eclipse start
Nov 23	6:40 am	Ganymede Eclipse start
Nov 30	1:27 am	Io Eclipse start
Dec 7	3:20 am	Io Eclipse start
Dec 14	5:14 am	Io Eclipse start
Dec 14	10:11 pm	Ganymede Eclipse end
Dec 14	11:54 pm	Europa Eclipse start
Dec 21	7:08 am	Io Eclipse start
Dec 21	10:32 pm	Ganymede Eclipse start
Dec 22	2:10 am	Ganymede Eclipse end
Dec 22	2:28 am	Europa Eclipse start
Dec 29	2:31 am	Ganymede Eclipse start
Dec 29	5:01 am	Europa Eclipse start

The Sun

Nov 10	rises at 6:45 am	sets at 4:59 pm
Dec 8	rises at 7:14 am	sets at 4:46 pm

The Moon

Nov 4	New Moon
Nov 11	First Quarter
Nov 19	Full Moon
Nov 27	Last Quarter
Dec 4	New Moon
Dec 11	First Quarter
Dec 19	Full Moon
Dec 26	Last Quarter

Events

Nov 14	Mercury at superior conjunction
Nov 17	The Leonid meteor shower peaks
Nov 19	Pen. Lunar Eclipse; mag=0.857
Dec 4	Total Solar Eclipse; mag=1.021
Dec 13	The Geminid meteor shower peaks
Dec 17	Saturn at opposition
Dec 21	Winter Solstice
Dec 26	Mercury at greatest elong: 19.9°E

The Planets

Nov 10	Rises	Transits	Sets
Mercury	06:35	11:44	16:53
Venus	05:35	10:46	15:57
Mars	04:08	09:52	15:37
Jupiter	23:10	06:10	13:06
Saturn	19:21	02:44	10:02
Dec 8	Rises	Transits	Sets
Mercury	08:25	12:58	17:31
Venus	03:49	09:15	14:41
Mars	03:47	09:10	14:32
Jupiter	21:24	04:23	11:19
Saturn	17:23	00:45	08:03

Each map depicts the sky at 0 hours for the 15th day of the respective month. The shaded area approximates the local horizon obstruction at the site.

Events in November and December

Shading indicates days that Crockett Park is open

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27 Start of EST	28	29	30	31	NOV 1 Prime observing YLSP@Spruce Knob	2 Prime observing
3 Prime observing YLSP@Spruce Knob NOVEMBER 1-4	4 NEW MOON	5	6	7	8 Prime observing	9 NASM observing @Sky Meadows NOVAC Star Gaze @Franklin Park (rescheduled)
10 Prime observing General meeting 7pm @GMU	11 FIRST QUARTER	12	13	14	15	16
17 * Leonid meteor shower peaks ATM-SIG meeting (location TBA)	18	19 FULL MOON * Penumbral lunar eclipse	20	21	22	23
24	25	26	27 LAST QUARTER	28 Thanksgiving	29 Prime observing	30 Prime observing
DEC 1 Prime observing	2	3	4 NEW MOON * Total solar eclipse	5	6 Prime observing	7 Prime observing Public observing @Crockett Park
8 Prime observing General meeting 7pm @GMU—Election of 2003 officers	9	10	11 FIRST QUARTER	12	13	14
15 ATM-SIG meeting (location TBA)	16	17	18	19 FULL MOON	20	21 Winter solstice
22	23	24	25 Christmas Day	26 FIRST QUARTER	27 Prime observing	28 Prime observing

“To observe, and to help others observe”

NOVAC is a non-profit, all-volunteer organization chartered to advance amateur astronomy in Northern Virginia. Members benefit from:

Access to dark sky observing sites:

NOVAC maintains agreements that provide club members with year-round access to observing sites away from city lights

Monthly meetings

Monthly meetings are held at 7 p.m. on the second Sunday of each month in Room 80 of the Enterprise Building on the campus of George Mason University. Each meeting features a lecture on an interesting topic by a local expert. See the web page or future newsletters for a schedule of speakers.

Bimonthly newsletter

The NOVAC newsletter provides information specifically for NOVAC members, as well as general interest articles on such topics as observing reports, equipment reviews, upcoming events, ATM projects, and more.

High-quality telescopes to borrow

NOVAC members may borrow one of the clubs several “loaner” telescopes at no charge. Members may choose from among three 6” reflectors of different focal lengths, one 10” f/6 reflector and a couple of SCTs. Also available for loan is a 7x50 binocular.

Large club library

NOVAC maintains a well stocked library that members may borrow from by contacting John Deriso (seaotter@bellatlantic.net). A full list of titles is available from the club website.

Club website

Up to date information about club events and activities is maintained on the club website at www.novac.com.

Private e-mail list-serve

Members keep up with current club information by subscribing to the NOVAC e-mail list, without fear of flame wars or spam e-mails.

Public outreach opportunities

Several times each year, volunteers from NOVAC present astronomy programs to schools, churches, Scout troops, and other public groups.

Membership in the Astronomical League

Through NOVAC’s membership in the Astronomical League, NOVAC members gain access to the AL’s newsletter, services, and observing programs.

Discounts on astronomy magazines and books

Subscriptions to *Sky & Telescope* and *Astronomy* magazines are offered to club members at a considerable discount. Also, astronomy books purchased through the club are eligible for a 10–25% discount.

See your Membership Guide for more details.



The **NOVAC Newsletter** is the official publication of the **Northern Virginia Astronomy Club** and is published **six times per year**. The NOVAC Newsletter is sent to members of NOVAC as a regular membership benefit.

Membership

Membership in the Northern Virginia Astronomy Club is \$25.00 per year and is open to anyone interested in astronomy or the sciences. Additional memberships at the same address without additional copies of the newsletter are \$5.00 per person. Contact:

Joe Pierson
15091 Jarrell Place
Woodbridge, VA 22193
703-680-6343
jmpierson@comcast.net

Change of address

All notices of change of address should be sent to Joe Pierson. Please include both old and new addresses.

Advertising

NOVAC does not knowingly accept advertising for products of inferior quality nor does it accept responsibility for the quality of advertised products.

Submissions to the newsletter

NOVAC members are invited to submit articles for publication in the *NOVAC Newsletter*. The editor reserves the right to edit all materials submitted. Send article submissions to the Editor, Michael Mills, at mjmills@fpcc.net. **The deadline for submissions is two weeks in advance of publication: December 10 for the January/February 2003 newsletter.**

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In this issue...

News and articles • A brief discussion of nebula filters •
"Ironman's" cold weather observing tips • Membership direc-
tory

Announcements • Star Gaze rescheduled for Nov. 9 at
Crockett Park • NOVAC elects officers in December •
The Year-Long Star Party at Spruce Knob • NASM/Einstein
Planetarium public observing

Regular features • President's message • Upcoming
NOVAC meetings • New members • NOVAC meeting
highlights • Sky maps • Jeff's observing report • Events in
November and December



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