



# BACK BAY observer

The Official Newsletter of the Back Bay Amateur Astronomers  
P.O. Box 9877, Virginia Beach, VA 23450-9877

## EPHEMERALS July 2014

7/11, 9:00 PM  
Garden Stars  
Norfolk Botanical Garden

7/11, 7:30 PM  
Star Hike  
Northwest River Park

7/12, 11:00 AM - 4:00 PM  
[BBAA Summer Picnic](#)  
Redwing Park  
1398 General Booth Blvd  
Virginia Beach

7/18, 8:30 PM  
Skywatch  
Northwest River Park

7/26  
Nightwatch  
Chippokes Plantation  
Surry, VA



## Looking Up!

Wow it is July already and pretty soon the days will be getting shorter! Not sure about everyone else but that is something I look forward to since it lets me get in some observing during the work week.

Recently the BBAA was invited to give a presentation at the 96x-fest rock concert which, while we had fun, didn't go quite as planned as we got hit with a huge thunderstorm. It seems that Mother Nature is still the master at messing up observing plans, which leads me to this month's short column on the ins and outs of weather guessing.

All of us have had our plans disrupted by bad weather at some point in the past. It is super hard to figure out what is really going to happen, and you sure as heck can't trust the weather guy on TV, as they are wrong usually as much as we are.

This year I've made a few bad calls when cancelling events. Some were because I had to meet a required decision deadline (something I'm working on getting removed), and at least one was because of a complete lack of event planning and weather. The latter was my bad as I didn't ensure that the event was set up.

What I have come to realize this year, is that when it comes to the weather, if it looks like there is a chance the event can be held (e.g., prediction is cloudy but no rain) then we will go ahead and try to hold the event, or at least make the call a few hours before hand. This does mean that we will have occasions where we spend time getting someplace only to be turned around due to weather.

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One way to avoid trekking out to a site only to find it is cancelled when you arrive is to utilize the notification features of the Night Sky Network (NSN). As you recall, each club member has an account on our club [NSN web page](#). After you log in, you can click the "My Profile" button and then choose the option to "Edit Profile." Once there you'll see different options you can choose to enable the system to notify you when an event is cancelled – by email, text and phone. In the case of the phone call, the system actually provides the person cancelling the event with a list of those who need to be called (if they submitted an RSVP for that event), so you will get a call from an actual person. This was set up after the Astronomy Day debacle but to date no one has

set up their account to get a phone call if an event is canceled at the last minute. If you do not manage your account and then don't get the cancellation message, please do not beat me up ☺. We are using the system as designed.

One more thing, when you choose the option to send a text message to your account, you will need to enter a text address. There are [instructions](#) on NSN that tell you how to do that depending on who your mobile phone carrier is. I would ask that before you enter a text address into NSN, please send a test email using that text address to your phone to ensure that it is set up correctly. I will try to notify you if you get it wrong, though.

*Jim Tallman*

## June 5, 2014 Meeting Minutes

The June 2014 meeting was called to order at 7:31 PM in the Plaza Middle School Planetarium in Virginia Beach by president Jim Tallman.

**Members in attendance were:** Neill Alford, Nick Anderson, Robert Beuerlein, Mark Gerlach, Dean Giangregorio, Mary Giangregorio, Jeff Goldstein, Pete Goulart, Michael Hiser, Chuck Jagow, Chris Jarvis, Thomas Jarvis, Jeff Klein, Leigh Anne Lagoe, David Lamb, Curt Lambert, Shawn Loescher, Ben Loyola, Matt McLaughlin, Bill McLean, Joey Quinn, George Reynolds, Mark Roehm, Melvin Spruill Jr, Jim Tallman, Paul Tartabini, Bird Taylor, and Michael Webster. **Guests** were Michael Bushell, Ruby LaCroix, Dustin Loescher, Tiffany Ramos, and Isaac Tan.

### Treasurer's Report

Chuck Jagow reported that there is \$1500.86 in the General Fund and \$889.67 in the Scholarship Fund, for a total of \$2390.53. The club has a total of 88 members and 75 are in good standing. AL dues are coming up.

### ALCOR (Astronomical League Coordinator):

- Nick Anderson was awarded his certificate and pin for the Double Star observing program and the Master Observer award. Ben Loyola just completed his Messier log to be reviewed.

### Scholarship Report:

- On behalf of the BBAA scholarship committee, Ben Loyola presented a \$1500 check to home-schooled student, Isaac Tan. Isaac read his essay about his experiences with amateur astronomy. He will be attending Geneva College.

### Observing Reports:

- Some members reported a faint view of Omega Centauri on Saturday night at the East Coast Star Party.

### Old Business:

- The revision committee for the by-laws needs to set a meeting date. Bird Taylor reported that he should have the keys next week for the RRRT on Fan Mountain. They are still waiting on an upgrade of the computer software.

### New Business:

- BBAA will be paid \$300 for participating in the 96X-Fest on June 19.
- Bird Taylor reported that the 20' x 20' deck with telescope mounts at the GAP should be finished soon. All materials for the deck were purchased by the City of Hampton.

### Meeting Presentation: Einstein's Relativity and Gravitational Waves

- Dr. John McNabb is a research assistant professor of atmospheric and planetary sciences at Hampton University. Dr. McNabb, without using complicated mathematics, discussed briefly how Einstein came to conclude that the speed of light was relative to nothing and can be used to measure time. He discussed how tidal forces and spherical geometry can help us understand the curvature of space-time that occurs in general relativity. When mass is accelerated, it creates a ripple in space-time called a gravitational wave.

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The Back Bay Amateur Astronomer's  
**Observer**

The BBAA Observer is published monthly; the monochrome version is mailed to members who do not have internet access. Members who do have Internet access can acquire the full color version on the Internet at <http://www.backbayastro.org/observer/newsletter.shtml>

Please submit articles and items of interest no later than the date of the monthly meeting in order to be in the next month's edition.

Please submit all items to:  
bbaa.newsletter@gmail.com or BBAA Observer, P.O. Box 9877, Virginia Beach, VA

## BBAA Meetings

The BBAA meet the first Thursday of every month except for July (when we have a picnic instead). The Picnic will be held at [Redwing Park](#) on Sat. July 12 from 11am to 3 pm. Contact an officer if you want to come but did not sign up yet. The next meeting will be held on Aug. 7. The location is to be determined, so stay tuned to [NSN](#).

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## BBAA Internet Links

BBAA Website  
[www.backbayastro.org](http://www.backbayastro.org)

Yahoo! Groups  
[tech.groups.yahoo.com/group/backbayastro](http://tech.groups.yahoo.com/group/backbayastro)

BBAA Observer Newsletter  
[www.backbayastro.org/observer/newsletter.shtml](http://www.backbayastro.org/observer/newsletter.shtml)

## June Meeting Minutes, continued from [page 2](#)



Ben Loyola presents 2014 BBAA Scholarship Winner, Isaac Tan, with a check for \$1,500 at the June meeting.

Dr. McNabb also discussed the different ways to search for gravitational waves, including the study of black holes, pulsars, and binary white dwarf stars.

### Door Prizes

- Mary Giangregorio won a Sky & Telescope magazine. Two guests won planispheres.

Minutes taken by Secretary Leigh Anne Lagoe

Minutes were modified due to space constraints. Full minutes can be viewed at

<http://backbayastro.org/minutes/2014-06-minutes.pdf>

# General Relativity

## *Early Evidence for its Existence*

By Nick Anderson

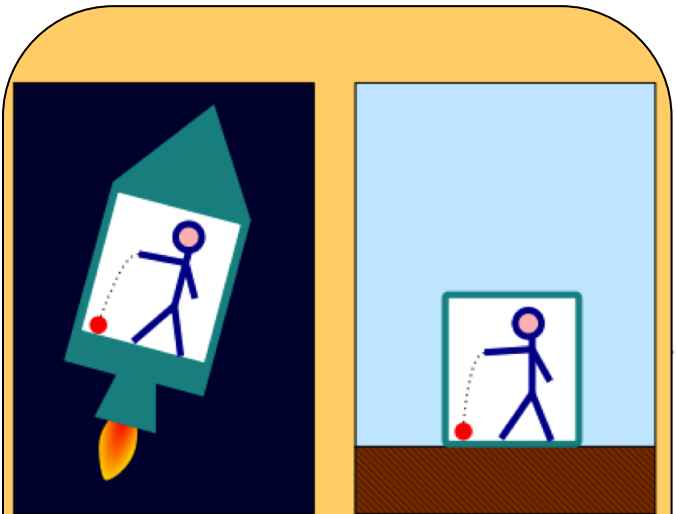
**The 1890's** were a troubling time for physicists. Even though this time period followed the great success of Maxwell's unification of electricity and magnetism, and Newton's laws of motion had been a hallmark mathematical description of physical behavior for centuries, a big problem could not be ignored: the observed and experimentally verified constancy of the speed of light in a vacuum. How could the speed of light measured by an observer be the same, regardless of the speed of the light source, without physics breaking down?!

Albert Einstein, then a patent clerk in Switzerland, became the first to have a sound answer with his groundbreaking *Theory of Special Relativity* (published in 1905). It was based on two simple postulates: (1) the speed of light is a constant and (2) the principle of relativity (demonstrated in Figure 1). Special Relativity was an update to Newton's laws, which could now only be treated as an approximation for velocities far below the speed of light. However, Einstein was left unsatisfied as special relativity only worked for inertial frames; that is, for objects traveling at constant speed.

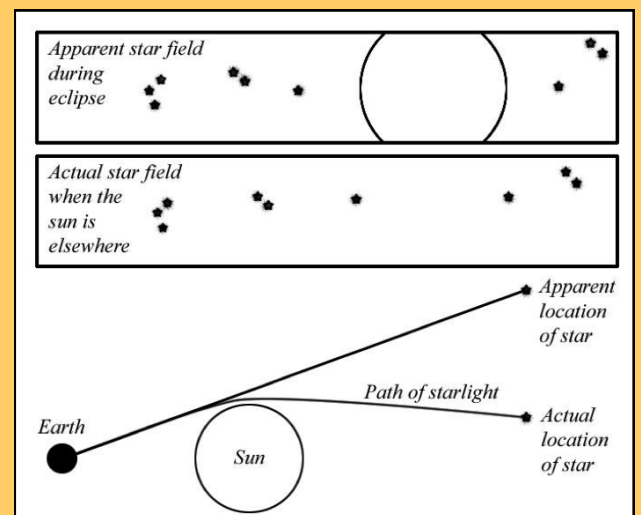
It wasn't until 1916 that Einstein finally published his *Theory of General Relativity*, owing to its mathematical and conceptual complexity. It expanded his Special Relativity to include a new theory of gravity. But others in the scientific community were understandably skeptical. It was one thing to find a mathematical model that worked, but another to actually put it to the test.

There were three experimental tests performed that led to the widespread acceptance of general relativity: the precession of Mercury's orbit, the bending of starlight by massive objects, and gravitational redshift. I will only be discussing the bending of starlight here, as it is perhaps the one of most interest to us amateur astronomers.

According to Einstein, light rays should be bent while passing through a strong gravitational field (as demonstrated in Figure 2). This effect was predicted to exist for the Sun, with one caveat: it is typically impossible to resolve stars next to the Sun! That is, unless the Sun's overwhelming glare can somehow be blocked out... (perhaps you see where this is going?)



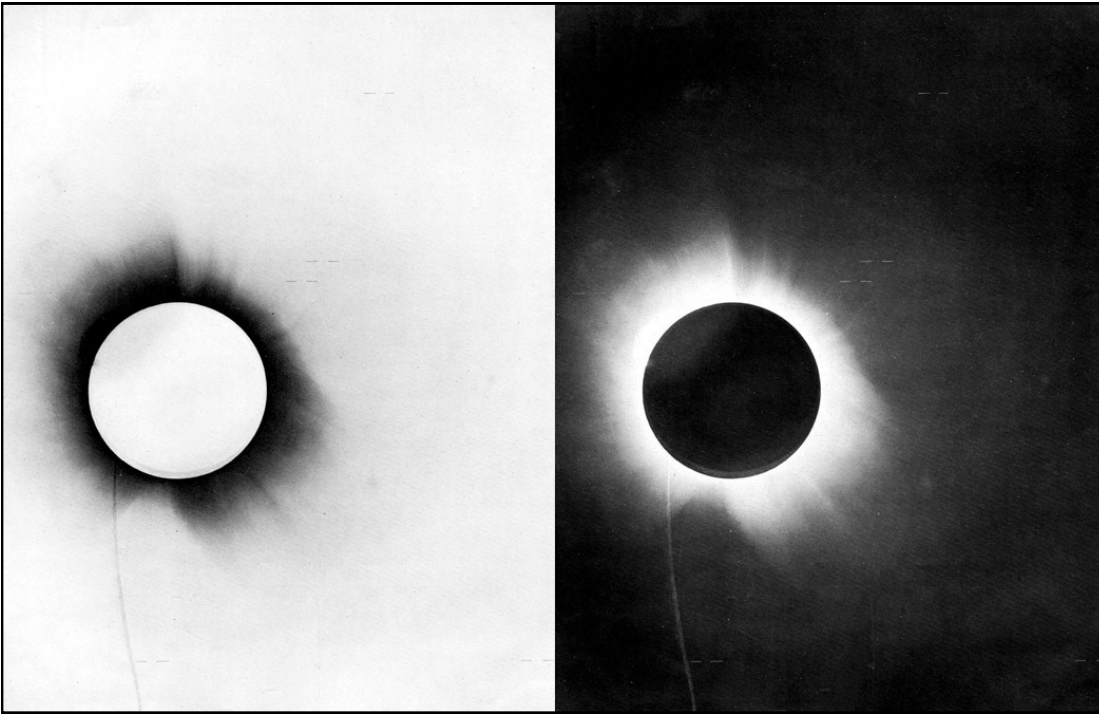
**Figure 1.** In this diagram, we have one scientist dropping a ball in an closed box accelerating at 1g (left) and another scientist performing the same experiment, but stationary on Earth with a gravitational force of 1g (right). The laws of physics will appear the same to both observers, a demonstration of the principle of relativity.



**Figure 2.** The Sun causes a curvature in spacetime, resulting in the distortion of the background starfield.

In May 1919, perhaps the most famous total solar eclipse occurred (a celestial event in which the Moon hides the Sun's overwhelmingly bright photosphere). British astronomer Sir Arthur Eddington conducted an expedition to Principe, an island off the west coast of Africa near the equator.

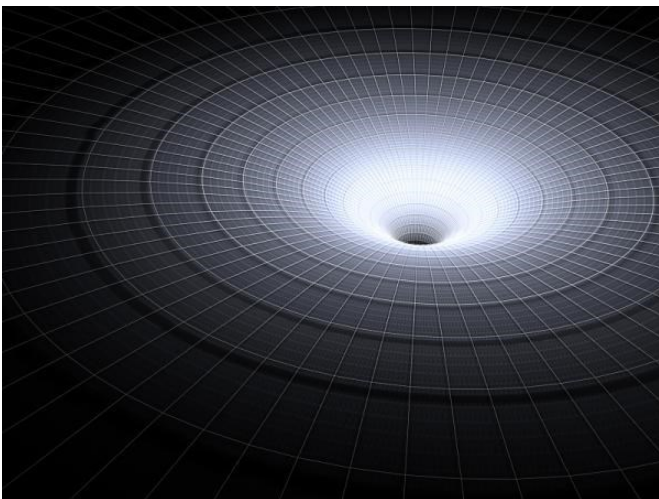
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**Figure 3.** One of Sir Arthur Eddington's original images of the May 29, 1919 total solar eclipse.

During the few minutes of totality, he took several images of the background stars appearing closest to the Sun. Remarkably, Eddington's results showed a slight shift in their positions, ultimately confirming general relativity's predicted deflection of starlight! As a result, Einstein soon became a household name across much of the world.

General relativity led to a revolution in our understanding of gravity, and the theory has stood the test of time for nearly a century. It has



**Figure 4.** The gravitational field surrounding an object of significant mass.

interesting and very non-intuitive implications. Gravity is not to be treated as a force, but rather, objects simply follow the shortest distance between two points in space (a curved four-dimensional space, that is).

I'll illustrate with an example of simpler dimensions: think of two airports on Earth at the same latitude, one located on the East Coast and the other in Europe. Sure we could just travel eastward on the line of latitude and get there, but is that actually the shortest path? No, the shortest path will be an arc with the ends curved downward. This is why most transatlantic flights will typically take you northward toward the Arctic: less fuel! (Not to mention the added benefit of being near land in the event of an emergency.)

Okay, back to relativity. Just like flight controllers try to minimize their travel paths, objects naturally follow this warped fabric of spacetime. What causes this curvature? Mass, and more of it means more curvature of spacetime. The curvature tells matter how to move. It's with this relationship that we can relate all of the mass and energy in the Universe with the geometry of spacetime.



**The May 2014**

**By Kent Blackwell**

# East Coast Star Party

**The May 2014** East Coast Star Party (ECSP) was a resounding success. Only a handful of us arrived on Thursday, most likely due to a rather gloomy forecast. The Norfolk & Virginia Beach areas had rain showers, but we never saw a drop of rain in Coinjock, NC.

It appeared that any chance of clearing skies was nearly zero so we knew Thursday would be a party night. If you've ever attended ECSP you know what that means. Ray & Glenda Moody, Jim Tallman, Chuck Jagow and others contributed to a nice BBQ dinner, complete with potato salad, coleslaw and white wine. After dinner we socialized and talked about the forecasters telling us that a beautiful weekend lay ahead.

Friday more and more people filtered in, but the skies remained cloudy during the day. On the plus side the temperature was well below normal, and that made things very comfortable. I heard reports that the clearing was coming, but it never did, at least not during the daylight hours.

In keeping with the "Dee and Roy tradition," Ray & Glenda Moody, Jim Tallman, Chuck Jagow and other BBAA members collected enough spaghetti to feed about 35 of us at the dinner hour, and I can't tell you how much we all appreciated it. Ray was going to dress up as Dee but we all convinced him that if he did we probably wouldn't be able to down the spaghetti. Ray's "Marilyn Monroe" Halloween costume last ECSP Halloween party was quite enough, thank you very much. The dinner was wonderful, but Dee, please recover by next October ECSP because we were all exhausted trying to do what you do!

Soon after dusk the sky began to clear, but it was hazy and the limiting magnitude was not exceptional. However, Kirk Leppert and I did spot M13 in Hercules naked eye. The view of that cluster in my 25" telescope knocked us both off our feet. Saturn in Allen Davis' 6" Takahashi refractor was pretty amazing as well. Although the transparency suffered, the atmospheric seeing was impeccable. Stars near the zenith were pinpoints in my 25" telescope.

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## May 2014 ECSP, continued from [page 6](#)

By Saturday morning the skies cleared nicely, just in time for group of us to make the usual brunch run to Mel's Diner. Uh oh, Mel's was closed until June, or so we thought, so most trekked to BJ's Restaurant "down the road" from Mel's instead. We found out later that Mel's was opened after all.

Saturday was simply a beautiful day, unseasonably cool and dry with the sky remaining perfectly clear all day. We had our usual 3:00 PM wine and cheese social hour. It was so good to see our dear friends Georgie June and her son Connor. Georgie is battling health issues and she is in all of our thoughts.

By 6:00 pm we were ready for some burgers and hot dogs. Thanks to Robert Hitt and his son Scott for doing the cooking. Thanks also go out to Leigh Anne Lagoe and others for assisting with cleanup.

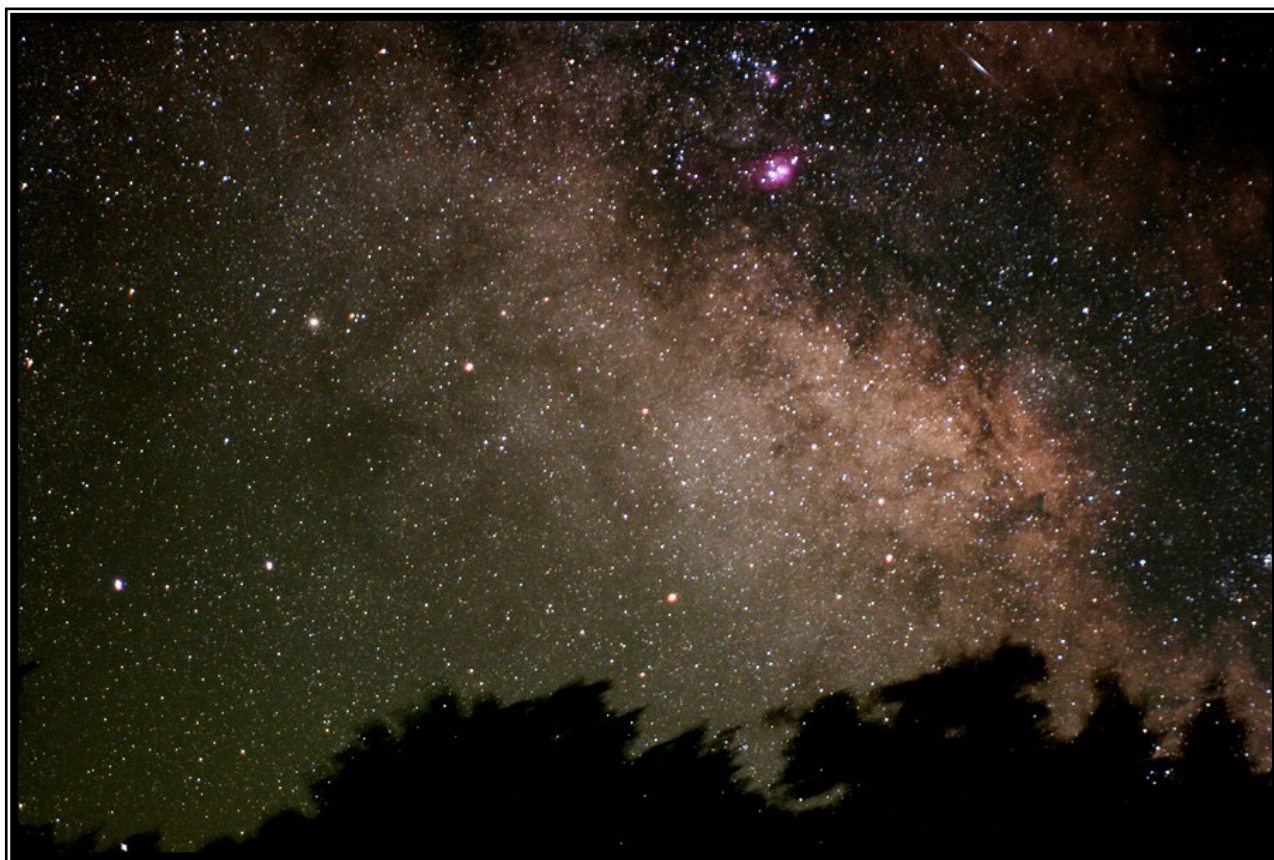
The door prize drawing is always a hoot. As usual Dale Carey held yards of raffle tickets, Between Dale and Jim Tallman, I figured they would walk away with every prize, but that was not to be. Everyone was happy to see two

Tidewater Community College (TCC) students win several prizes, including an Orion telescope.

By nightfall the sky was wonderfully clear. In fact I read one of the highest readings ever at Coinjock on my Sky Quality Meter, 21.44. By 11:00 pm clouds drifted in, so that spelled the end of observing. Well, not really because by 1:15 am it began to clear, and it was even better than before. This time I got a reading of 21.47! I rated the atmospheric seeing as 10/10 as well. The globular cluster M 5 was simply astonishing in my 25" telescope. Several TCC students had never looked through a quality telescope before, so it was quite a sight to them.

After taking some skyscape pictures of the summer Milky Way at 3:00 am it was time for me to call it quits. Several others stayed up all night. Before retiring I took a quick look at several objects in Robert Nielson's beautiful 10" Takahashi Dall-Kirkham telescopes.

Once again, ECSP provided us a fun and relaxing weekend. I hope everyone had as good a time as I. We certainly missed Roy & Dee but they promise to be back with us for the October ECSP. I'd like to thank everyone for their support.



There's no better reason for sleep deprivation than a view of the summer Milky Way from the dark Coinjock skies. Numerous clusters and nebulae can be seen in this wonderful image of Sagittarius by Kent Blackwell. If you look closely in the upper right corner, you can see that Kent even captured a meteor!

*Details: May 31, 2014 with Canon 20Da Camera. 70 mm lens at f/3.2, 121-second exposure at ISO 800.*



## July 2014

BBAA Events	Special Outreach	Astronomical Events
7/11 Garden Stars @ NBG	7/11 Star Hike @ Northwest River Park	7/5 First Quarter Moon
		7/12 Full Moon
7/12 BBAA Summer Picnic Redwing Park, VA Beach	7/14 Sun-Earth Connection Kempsville Library	7/18 Last Quarter Moon
7/18 Skywatch @ Northwest River Park	7/15 Sun-Earth Connection Windsor Woods Library	7/26 New Moon
7/26 Nightwatch @ Chippokes Plantation		7/28 Delta Aquarids Peak

### Sneak Peek into August

Fri 8/01/2014 Garden Stars at Norfolk Botanical Gardens, 9:00 pm  
 Tue 8/05/2014 Boardwalk Astronomy #4, 24th St. VA Beach, 6:00 pm  
 Sat 8/07/2014 Monthly Meeting, Location TBD, 7:30 PM  
 Fri 8/15/2014 Skywatch at Northwest River Park  
 Sat 8/23/2014 Nightwatch at Chippokes State Park, Surry VA.

