

**Highlights of the
July Sky...**

... 1st ...

New Moon

... 1st → 19th ...
DUSK: Mercury visible ~8° above the WNW horizon.

... 2nd ...

DUSK: Very thin crescent Moon visible to Mercury's lower left.

... 3rd → 4th ...

DUSK: Crescent Moon is left of Mercury and below Regulus.

... 6th ...

DUSK: Mercury in Beehive Cluster (M44). Binoculars required.

... 6th → 8th ...

PM: Moon passes below Saturn and Spica.

... 8th ...

First Quarter Moon

... 11th ...

PM: Antares is 2.5° below the Moon.

... 15th ...

Full Moon

... 23rd ...

Last Quarter Moon

... 23rd & 24th ...

AM: Waning Crescent Moon within 7° of Jupiter.

... 25th & 26th ...

AM: The Moon is near the Pleiades and Hyades.

... 27th ...

DAWN: Mars is 3° to lower left of crescent Moon.

... 28th → 30th ...

PM: Southern Delta Aquarid meteor shower peaks (ZHR = 20).

... 30th ...

New Moon

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ July 2011 ★ ★ ★

This Month's KAS Events

General Meeting: Friday, July 8 @ 7:00 pm

Kalamazoo Nature Center - Details on Page 12

Observing Session: Saturday, July 9 @ 9:00 pm

Saturn & Moon - Kalamazoo Nature Center

Board Meeting: Sunday, July 10 @ 5:00 pm

Sunnyside Church - 2800 Gull Road - All Members Welcome

Observing Session: Saturday, July 30 @ 9:00 pm

Pleasant Planetary Nebulae - Kalamazoo Nature Center

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JUNE Meeting Minutes

The general meeting of the Kalamazoo Astronomical Society was brought to order by President Jack Price on Friday, June 3, 2011 at 7:16 pm EDT. Approximately 33 members and guests were in attendance at the Kalamazoo Area Math & Science Center (KAMSC).

Our guest speaker for the June meeting was Horace Smith, Professor of Astronomy at Michigan State University. Prof. Smith's topic was entitled *Pulsating Stars*, which is his specialty. The story of pulsating stars begins with David Fabricius, a German theologian that discovered Mira was a pulsating star (the first discovered). The exact nature of Mira variables is still a bit of a mystery today.

John Goodricke and Edward Pigott independently discovered Cepheid variable stars in 1784, Goodricke discovered the variability of Delta Cephei, while Pigott observed Eta Aquilae vary in brightness. Henrietta Leavitt showed that the Cepheids could be used as "standard candles" to measure distances in space. Harlow Shapley discovered how Cepheids pulsate; allowing him to determine how intrinsically bright Cepheids are. This allowed us to measure great distances in space. Edwin Hubble used this method to figure out the distance to the Andromeda Galaxy.

Prof. Smith then described how Cepheid variables pulsate. Cepheids lie along a region of the Hertzsprung-Russell diagram called the instability strip. Stars in the instability strip are unstable and pulsate because a layer of partially ionized helium in the star's atmosphere can absorb and release energy. Cepheids show a period-luminosity relationship. That is the most massive stars pulsate the slowest, while less massive stars pulsate rapidly.

Aside from specializing in pulsating stars, Prof. Smith had another reason for giving his presentation. This year marks the 100th anniversary of the American Association of Variable Star Observers (AAVSO). For a comprehensive history, please visit *History of the AAVSO* on their [website](#). For those interested in variables stars and especially variable star observing, Prof. Smith recommended the new book *Advancing Variable Star Astronomy* by Thomas R. Williams and Michael Saladyga. Cambridge University Press is offering a 20% introductory discount on their [website](#) (use code: AAVSO100).

Jack gave his president's report after the snack break. He mentioned the lunar eclipse on June 15th, but it won't be visible from North America. Don Stilwell said that he, Rich Mather, and Mike Cook has a mini-star party at Richland Township Park in late May. The meeting concluded at 9:01 pm after discussing current astronomical events.

BOARD Meeting Minutes

The KAS Board met on June 12, 2011 at Sunnyside Church. President Jack Price called the meeting to order at 5:14 pm. Board members present were Richard Bell, Joe Borrello, Dick Gillespie, Scott Macfarlane, Don Stilwell, and Roger Williams.

In the absence of Rich Mather, there was no Treasurer's report. The Robotic Telescope committee had not met since the last board meeting, but Richard reported some news regarding Mike Patton's observatory. The PlaneWave telescope intended to be set up for testing arrived damaged from shipping. It was sent back to the manufacturer, after which it will need to be sent immediately to the customer. The components for the remote control system in Mike's facility are present, but it is not clear when or if PlaneWave will set them up now. Over the long term, another demo telescope may be sent. Meanwhile, Mike had a question about getting a dedicated IP address set up for a video camera in the observatory. Joe volunteered to consult on the issue.

Regarding the general meeting schedule, Richard confirmed that Grant Mathews from Notre Dame University will be the speaker at the September meeting. A brief report was presented by those present who had been at the Pierce Cedar Creek 10th anniversary festival (Dick, Don, Jack, Richard, and Jean DeMott). The consensus was that attendance was light (about half that at the Celery Flats Green-A-Thon), but that those who stopped by the table were interested and engaged. A new family membership was gained, as well. The last public observing session (June 4th) had very poor observing conditions.

In other Old Business items, still nothing had been done yet towards purchase of a new case for the Coronado PST and a finderscope for the Celestron 8" NexStar telescope. Dave Woolf will be asked about the status of this.

Under New Business, Richard said that things were in order for the Perseid Potluck Picnic on August 6th, and Don is providing use of his grill again. Jack discussed a number of possibilities for summer star parties, most of which unfortunately seemed to conflict with his other obligations.

Don reminded everyone that we will make an appearance at Crane Fest on both October 8th and 9th. Solar observing is planned, and you can see the cranes as well. Last year gave good crowds.

The next meeting was set for July 10th, same time and place. The meeting was adjourned at 6:00 pm.

Respectfully submitted by Roger Williams

Astronomy Day 2011 Report

by Richard Bell

Astronomers of the mid-19th century faced a problem. The planet Uranus, discovered in 1781 by the legendary observer Sir William Herschel, wasn't following its predicted orbit. This led astronomers to deduce the existence of a massive planet beyond Uranus' orbit. French mathematician Urbain Le Verrier spent several months in 1846 calculating the position of this unknown world. German astronomer Johann Gottfried Galle found this world, Neptune, on September 23, 1846 within 1° of Le Verrier's predicted position. The discovery was a triumph for Newtonian physics. After all, Neptune was discovered on paper before it was ever identified in a telescope!

However, all was not well with the solar system. Neptune's gravitational influence on Uranus still couldn't explain the orbital discrepancies. Astronomers again suspected yet another massive planet beyond Neptune. The wealthy Bostonian and amateur astronomer, Percival Lowell, decided to search for this proposed ninth planet which he dubbed "Planet X." Lowell started his search after making calculations in 1905, but died in 1916. Lowell Observatory hired a young Kansas farm boy named Clyde Tombaugh to continue the search. Clyde struck pay dirt with the discovery of Pluto in 1930. After all, Pluto was close to Lowell's predicted position. It MUST be Planet X. Not so fast!

Initial mass estimates for Pluto were the same as Jupiter's. It wasn't long before astronomers realized Pluto was much smaller and less massive than predicted. Pluto's mass was calculated to high precision thanks to the discovery of its largest moon, Charon, in 1978. Pluto was only 0.2% the mass of Earth – far too small to influence Uranus' orbit. In the end, Planet X was never needed. Uranus' orbital peculiarities vanished when astronomers used *Voyager 2* data to calculate a more accurate mass for Neptune. Lowell's calculated position for Pluto and Clyde's discovery turned out to be an amazing coincidence. Still, Pluto was our solar system's ninth planet. What else could it be?

The first clue came in the 1950's with the prediction of the Kuiper Belt, an icy realm beyond Neptune's orbit. Was Pluto really the first member of this region of the solar system? Was Clyde's discovery an oddball planet or did he find something way ahead of its time? David Jewitt and Jane Luu discovered the first definite Kuiper Belt objects in 1992. Hundreds more were to follow. Still, they were all significantly smaller than Pluto so calls to reclassify Pluto fell on deaf ears. The controversy over Pluto's planetary status got louder with the discovery of Quaoar, an object more than half of Pluto's size, by Mike Brown and Chad Trujillo in 2002. Brown and Trujillo (with David Rabinowitz) went on to discover Sedna and Orcus in 2004. These icy worlds are three-quarters and two-thirds, respectfully, the size of Pluto. Finally, the moment came in 2005. Brown, Rabinowitz, and Trujillo discovered Eris; an object definitely more massive and almost certainly larger in diameter than Pluto.

The International Astronomical Union reclassified (or demoted) Pluto to a "dwarf planet" at their general meeting on August 24, 2006. After 76 years, the solar system's planet count was reduced to eight. The lead astronomer in Eris' discovery, Dr. Mike Brown, became known as the "Pluto Killer." Dr. Brown told his story in his book *How I Killed Pluto and Why It Had It Coming* and (FINALLY!) at the Kalamazoo Astronomical Society's Astronomy Day spectacular on May 7, 2011!

We've been fortunate to have some great Astronomy Day Keynote Speakers the past three years thanks to the generosity of the Irving S. Gilmore Foundation. Noted astronomer, skeptic, and writer Phil "The Bad Astronomer" Plait was our guest in 2009. Famous NASA astronaut and veteran of the first Hubble Space Telescope repair mission,



This year's special guest was Dr. Mike Brown, Professor of Planetary Astronomy at the California Institute of Technology. Dr. Brown is best known for discovering Eris, the largest object found in the solar system in 150 years, and the object which led to the debate and eventual reclassification of Pluto.

Story Musgrave, appeared in 2010. Mike Brown was our first guest that made a famous and fundamental discovery of our solar system and it was a real honor having him as our guest. I must admit that Dr. Brown was not my first choice for Astronomy Day 2011. He was certainly on my list of future keynote speakers, but I was hoping to save him for 2014 or 2015, just before *New Horizon*'s scheduled flyby of Pluto. The original idea was to do a Mars theme in honor of the launch of the new Mars rover, Curiosity, in August. It turned out that both my top picks, Steve Squyres and Jim Bell, were out of our price range. Dr. Brown's book had just been released earlier in the year, so I decided to invite him sooner than planned.

In honor of Dr. Brown's visit, the theme of Astronomy Day 2011 was "Icy Worlds of the Outer Solar System." These include the moons of the gas giants, comets, and similar objects in the Kuiper Belt. Our main display reflected this theme. One might think that Pluto would be an obvious theme, but we already did that in 2006. Besides, Mike Brown's research goes beyond Pluto and even Eris. Our secondary theme was the innermost planet, Mercury, in honor of MESSENGER's arrival in orbit in March. We had a display of MESSENGER flyby images of Mercury as well. Be sure to also check out the latest MESSENGER images of Mercury from orbit. Two of our standard displays, "Meet the Telescopes" and KAS member astrophotography, returned this year. **Bill Nigg** kept a watchful eye on the telescopes and answered many questions.

For the third year-in-a-row, daytime festivities were held at the Kalamazoo Valley Museum from 10am – 4pm. Weather forecasts earlier in the week had us convinced that solar observing would be clouded out like it was in 2010. May 7th turned out to be a very nice day with pleasant temperatures and mostly clear to partly cloudy skies throughout the morning and early afternoon. **Jim Kurtz** setup his Tele Vue



Skies were clear enough on Astronomy Day to allow some solar observing. This young astronomer checks out the Sun in hydrogen alpha with the Coronado Personal Solar Telescope (PST) owned by the KAS.

NP101 equipped with a Coronado SolarMax 40 hydrogen alpha filter. **Tim Kurtz** used the Coronado PST owned by the KAS and available for loan to its members. **Roger Williams** setup his trusty Coronado MaxScope 60 H α telescope. There were some sunspots visible as well as some decent looking prominences. Conditions became too cloudy by mid-afternoon, but we got more Sun than anticipated so no complaints here.

Upon entering the museum, visitors were greeted by **Jean DeMott** and **Molly Williams** in the morning and by **Beverly Byle** and **Jack Price** in the afternoon. **Gary Leadley** manned the Keynote Presentation Ticket Table from 11am – 4pm. The popular Freebie Table was staffed by **Dheeraj Nosina** and **Bill Van Dien** in the morning and then by **Rich Mather** and **Oxnar Theealien** in the afternoon. Both Dheeraj and Oxnar were volunteering for the first of many times I hope. Items for the Freebie Table were provided by *Astronomy* magazine, Carnegie Institute of Washington, Chandra X-Ray Center, Goddard Space Flight Center, Jet Propulsion Laboratory, and NASA Space Place. Terence Dickinson (our special 75th Anniversary guest speaker in November) also provided complimentary copies of *SkyNews* magazine. Meijer supplied plastic shopping bags, so our visitors could carry their free stuff home.



The Constellation Can made a return after a 12 year absence. **Joe Borrello** helps this young astronomer pound in his constellation of choice (*Ursa Major*).

Things went very well at the Sales Table again this year. We sold approximately 40 copies of Mike Brown's book *How I Killed Pluto and Why It Had It Coming*. Sales for our special KAS 75th Anniversary T-Shirts were also very good. Regular SkyShop items also did well. A few Miller Planispheres found new homes and we sold our remaining supply of KAS SkyCaps. Strong sales like this help offset Astronomy Day expenses and make it possible to continue holding our annual outreach event at this level. **Rich Mather** and **Frank Severance** volunteered at the Sales Table in the morning and were relieved by **Scott**



This volunteer helps Richard Bell demonstrate how comets grow long tails when they get close to the Sun. The breeze from the fan stands in for the Sun's light and solar wind. A 12" Styrofoam ball (with ribbon tails) acts as the comet. This photo was taken during the 11am performance of *Cooking Up A Comet*.

Macfarlane and Dennis Stuart in the afternoon. Just remember, the [SkyShop](#) is open year-round and all proceeds help fund KAS activities.

The hands-on activities were extra crafty this year! This meant they required a lot of advance preparation. Several members helped out at a special "Astronomy Day Prep Party" on April 30th. These include Joe Borrello, Joe Comiskey, Jean DeMott, Dick & Jackie Gillespie, Jack Price, Don Stilwell, and Roger Williams. Two of the activities tied directly into our theme. These include the "Fan Comets" and "Pluto Globe". Jean deserves most of the credit for prepping the "Fan Comets." They were made of a 1.25" Styrofoam ball and party shred. She developed an elaborate method of joining the ball with the shred and then allowing it to be easily clipped to a fan with a mini-black clip. The fan mimicked the solar wind and allowed the tail to flow in the breeze. Don Stilwell and Dave Woolf helped kids assemble fan comets in the morning and Barb & Bob Havira took over in the afternoon.

The Pluto Globe was provided by the Kingman Museum. Jennifer Sellers, KAS member and Kingman's Special Projects Manager, worked at the table the entire day. She was assisted by Brent Sanford in the morning and by John Grace in the afternoon. The next activity, Constellation Cans, made a long-awaited return. The last time we used the cans was 1999. Kids had one of four constellation patterns to choose from. They then used a hammer and nail to punch out the constellation pattern. After decorating their can, they could take it home, shine a flashlight through the open end and see their favorite constellation projected on the wall or ceiling. The hope is they'll one day see and recognize the real thing in the night sky. Sam Borrello and Mike Cook helped kids build a constellation can in the morning and Joe & Patti Borrello helped kids in the afternoon.

The fourth hands-on activity was Star Decoration. Morning volunteers here were Carol Van Dien and my nieces Alexis Bell and Merina Allegretti. Afternoon volunteers were Susan Bond, Becky Csia, and Sarah Stuart. There wasn't anything particularly educational about this activity, but it sure was popular. I saw many creative designs throughout the day. At least this activity gets kids thinking about stars. That's something, right?

Actor/Educator Mike Francis was one of our featured attractions at recent Astronomy Day events. He portrayed Galileo in *The Starry Messenger* in 2009 and as *The Stargazer's Apprentice* in 2010. It would have been great to have him back a third time, but I decided to use the funds to bring in some special guest speakers for 75th anniversary events throughout the year. Instead, I wanted to do comet making presentations to go along with our theme of icy worlds. And I didn't want it to be just a plain comet making demo. I wanted it to be a more interactive program in the



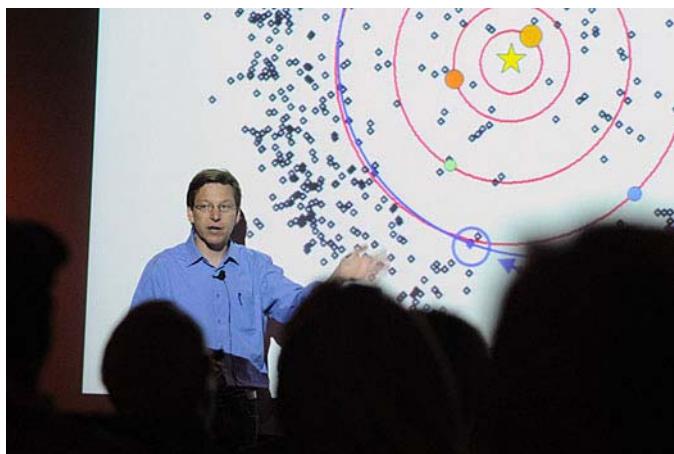
This young astronomer looks very proud of the comet he helped make out of water, dirt, ammonia, corn syrup (organic molecules) and dry ice during the *Cooking Up A Comet* presentation on Astronomy Day.

style of Mike Francis. Finding a presenter was difficult. I asked at least four people, but they all had prior commitments. I then realized I should do it since I already had most of the program mapped out in my head anyway. The presentation was called *Cooking Up A Comet* and was held at 11am and 3pm.

My program started with a short introduction on the history of comets and their place in the solar system. To help understand how comets get their tails I did a demonstration using a larger version of a fan comet. A volunteer from the audience held a 12-inch Styrofoam ball on a stick. I then started a large fan that we borrowed from Paragon Storage. The volunteer slowly moved the comet (on a stick) closer to the fan and then the tail – made of ribbons – grew longer. The last half of the program was spent making two comets out of water, dry ice, etc. The amazing thing is that the show was designed to last 35 minutes and it did. That's amazing for me!

New this year was a door prize drawing. It was held immediately following the last *Cooking Up A Comet* presentation. The Stryker Theater was nearly full, so it was pretty successful. **Jean DeMott** helped me give away our prizes. In addition to prizes donated by the KAS, we received contributions from HobbyTown USA, Kingman Museum, and Orion Telescopes & Binoculars. We also received a gift subscription from *Astronomy* magazine, but didn't receive it in time for the event. We'll save that as a Holiday Party BINGO prize!

As noted earlier, Dr. Mike Brown, Professor of Planetary Astronomy at the California Institute of Technology, was our special guest this year. He signed copies of his book, *How I Killed Pluto and Why It Had It Coming*, at the museum from 1 – 4pm. He then gave the keynote presentation, based on his book, in the Cooper's Glen Auditorium at the Kalamazoo Nature Center at 7:00 pm. Approximately 130 KAS



Dr. Brown gave an excellent keynote presentation in the Cooper's Glen Auditorium at the Kalamazoo Nature Center. It was a fitting conclusion to a great Astronomy Day celebration.



New this year was the Astronomy Day Door Prize Drawing; hosted by Richard Bell and Jean DeMott. One of our many prizes was a rocket starter set, donated by HobbyTown USA.

members and guests were in attendance. Both Phil Plait and Story Musgrave gave excellent talks, but I enjoyed Dr. Brown's presentation best of all. Be sure to read his book if you missed the talk. That covers most of what was discussed. Thanks to **Jean DeMott** (again) for greeting visitors and to **Don Stilwell** for collecting tickets. Lastly, I'd like to thank **Dan Flanagan** for taking photos throughout the day – especially when I couldn't.

The only piece of bad news for Astronomy Day 2011 (besides the weather, which forced us to cancel the Public Observing Session) was attendance. It was down compared to the past two years. An estimated 450 people attended activities at the museum. Publicity is not to blame. This was easily our best advertised Astronomy Day thus far. Two articles were featured in the *Kalamazoo Gazette* on the same week. There were numerous plugs for Astronomy Day on WMUK and a decent buzz online. It turned out that the first weekend in May was a very busy one around west Michigan. May 8th was the day of the first ever Kalamazoo Marathon. The Kalamazoo Symphony played music by John Williams at Miller Auditorium on the evening of May 7th and music from *Star Wars* on the afternoon of May 8th. May 7th was also National Train Day. Plus, just about every college and university around the state was holding commencement that day. Nevertheless, our annual celebration was a great success. I'd like to again thank all the volunteers that again made it possible.

Mark your calendars. Astronomy Day 2012 will be held on Saturday, April 28th.

Take the Next Step



by Tom Koonce

The moderate summer evenings are finally here and the best time of year to observe the sky has arrived. I have written at length in the past about how to get started in amateur astronomy, but this month we'll step it up a few notches with a discussion of what I think a beginner needs to take observing to the next level. I have no business association with any of the companies mentioned in this article, but have extensive experience to back up each of my recommendations below. I'm calling it as I see it. Your actual mileage may vary.



First, get a *Telrad* for your telescope. This "1× spotting scope" is the most useful accessory you'll get and many star guides, maps and books are written that use its illuminated 0.5, 1.0 and 2.0 degree centering circles. I also recommend installing a "blink"

kit on the Telrad to cycle the red illumination on and off to help your night vision when locating very dim deep-sky objects. There are other 1× finders on the market that you can use, but I think the Telrad holds up the best over time.

Next, you're going to be considering getting eyepiece filters and maybe even a new eyepiece. Here's what I think are the essentials and I list them in priority order.

Get a *Thousand Oaks Solar Filter* for your telescope. By doing so, you will have instantly doubled the utility of your scope because you'll also be able to observe during the day with your telescope. The Sun is our nearest star and a high quality glass solar filter will last you many years.

Make sure that you have *decent quality eyepieces* that will yield magnifications of approximately 50× through 200×. I



recommend Tele Vue, Meade or Celestron Super Plössls. It's essential that you have great eyepieces to match the great telescope that you are using. Go to a Star Party with your telescope and set up next to someone who can lend you several different eyepieces for you to try out. Find ones that you really like and buy ones just like them. Don't buy any eyepiece that you haven't had a chance to use. On the question of whether or not to buy 1¼" or 2" eyepieces, I'll say that if you really enjoy amateur astronomy, you will eventually be buying 2" eyepieces, but

they are expensive and you need to have a good idea of the kind of observing you will be doing most of the time. Eyepieces hold their value very well, so hold off on buying the 2" eyepieces for now and get the best 1¼" eyepiece that you can afford. If you've been reading my articles over the years, you'll know that I recommend that buying eyepieces that are in excellent shape from amateur astronomy-based websites like [Astromart](#) and build up your collection, but you should also consider companies which offer great prices for brand new eyepieces such as Oceanside Photo & Telescope (OPT) and Woodland Hills

Telescope.



Get a high quality *O-III* (pronounced "Oh-three") *narrow band-pass filter* that screws into the base of your eyepieces. This is the most useful deep sky filter. If you enjoy observing deep-sky objects like the Ring Nebula, Swan Nebula, or would like to observe the Veil Nebula, then get the O-III before you buy a light pollution filter, a set of color filters, or a Moon filter.

If you have a Schmidt-Cassegrain telescope, get a "Skylight" filter to seal the back of the telescope tube. Then get a high quality, 2" diagonal with a 1 ¼" adapter. I like the 2" Tele Vue diagonal.

If you have a Newtonian telescope, get a quality *Barlowed laser collimation tool*. 90% of all of the Newtonians / Dobsonians people have me look through at star parties are incorrectly collimated and are thus performing at far less than their optical potential. The collimation tool will help you attain new levels of focus with your Newtonian. I use the Howie Glatter Barlowed laser collimator and am extremely pleased with it.



Get an *adjustable red light flashlight*. Make sure that the brightness can be dialed down very close to the off position so that minimum light is illuminated. Now that you're taking the next step in amateur astronomy, you're going to



have to pay more attention to your night vision. After your eyes become dark adapted, most of the single switch red flashlights are too bright and are useful only to upset other observers around you. Begin to pay more attention to observing etiquette. You shouldn't walk up to other observers with your red flashlight on

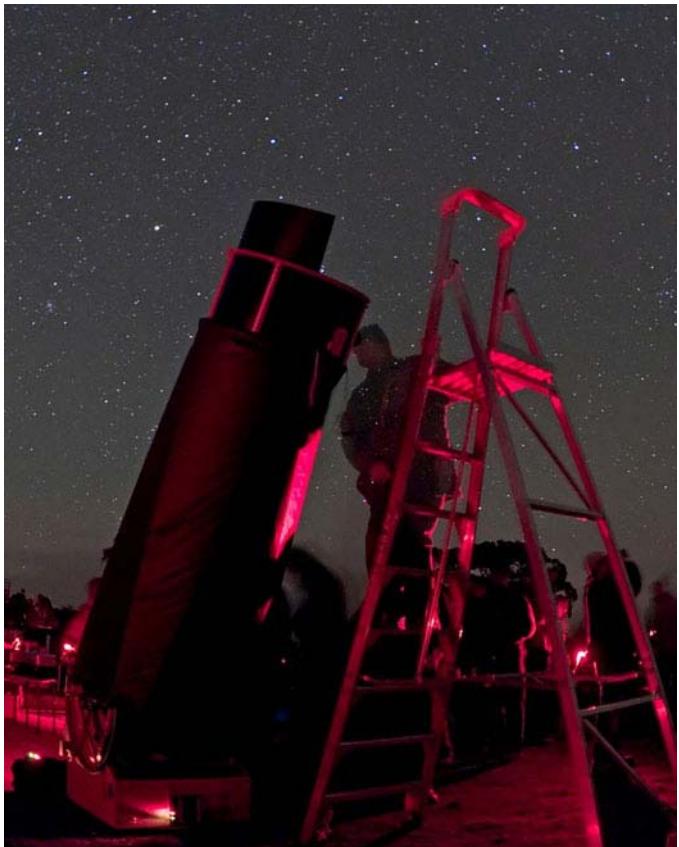
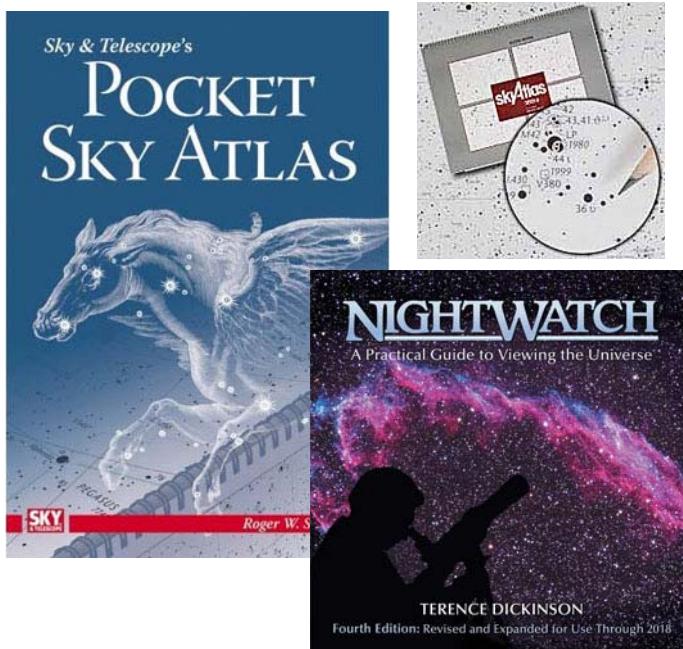
its cord around your neck, turned up to high, thus affecting other's night vision. It is encouraged for you to park with your car headlights pointed away from the general observing area and to turn your car's interior dome lights off at the beginning of the evening.

Get a *polarizing Moon filter*. This is made up of two polarizing filters that can rotate about each other so that you

can "dial" the brightness of the Moon up or down to counter the brightness when directly observing the Moon. You'll find this much handier than a single neutral density filter for changing brightness of the phases.



Get a good *night sky atlas*. If you have an eight inch or larger telescope, I prefer the large "Sky Atlas 2000.0 Deluxe Laminated" atlas, with black stars on a white background. For smaller scopes, you can take a look at Sky & Telescope's "Pocket Sky Atlas". This is the right time to re-read the great book *NightWatch – A Practical Guide to Viewing the Universe* by Terence Dickinson.



Get a *portable table* to take with you observing. A sturdy folding card table works well. You'll need a place to put your maps and eyepieces.

Begin working on your Messier Pin. This is an observing challenge sponsored by the Astronomical League. By completing the observation of all of the Messier objects, you will truly know the night sky.

Dedicate an *old blanket, carpet, or artificial turf* to put beneath your telescope when observing. It will keep dirt and dust off of your scope, and when you drop that new eyepiece or little retaining screw out of your diagonal at 2:00 am, it will help spare those around you from hearing a staccato of four letter words punctuating the night. Not that *I've* ever done such a thing myself...

This will get you started. I didn't mention other items such as an observing stool to sit on, color filters, a warm jumpsuit, or large camp chair for taking a break. You can add these as you go forward. Advancing in amateur astronomy is not about the *equipment*, but about *honing your observing skills*. Each item I've mentioned will either enable or simplify the technical portion of observing so that you can concentrate more on the sky and less on whether or not you have the necessary resources at hand.

Tom Koonce is a member of the Antelope Valley Astronomy Club in Lancaster, California.



Finding Planets among the Stars

by Dr. Tony Phillips

Strange but true: When it comes to finding new extra-solar planets, or exoplanets, stars can be an incredible nuisance.

It's a matter of luminosity. Stars are bright, but their planets are not. Indeed, when an astronomer peers across light years to find a distant Earth-like world, what he often finds instead is an annoying glare. The light of the star itself makes the star's dim planetary system nearly impossible to see.

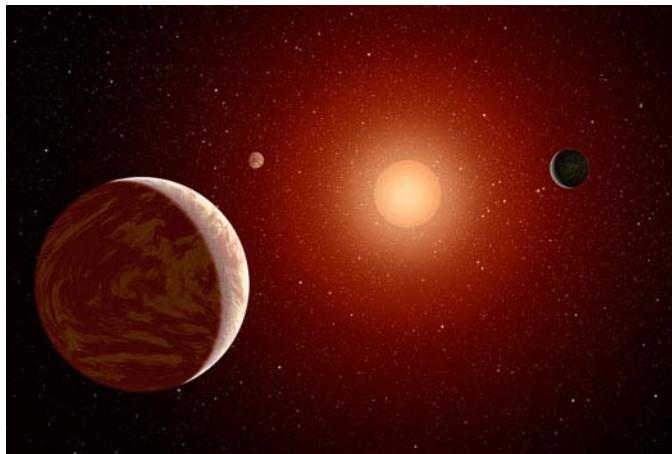
Talk about frustration! How would *you* like to be an astronomer who's constantly vexed by stars?

Fortunately, there may be a solution. It comes from NASA's Galaxy Evolution Explorer, an ultraviolet space telescope orbiting Earth since 2003. In a new study, researchers say the Galaxy Evolution Explorer is able to pinpoint dim stars that might not badly outshine their own planets.

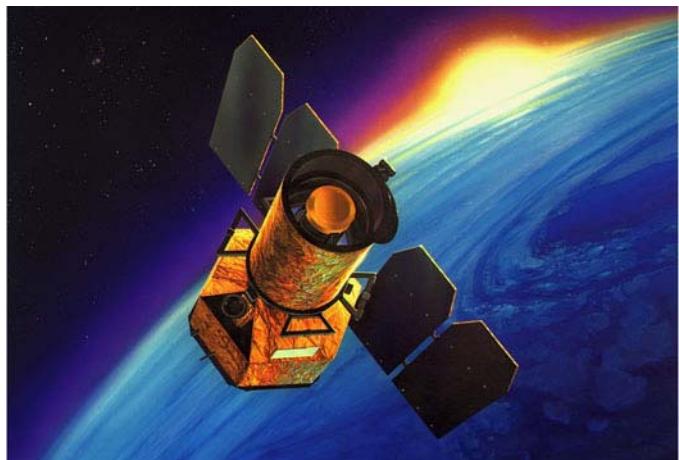
"We've discovered a new technique of using ultraviolet light to search for young, low-mass stars near the Earth," said David Rodriguez, a graduate student of astronomy at UCLA, and the study's lead author. "These M-class stars, also known as red dwarfs, make excellent targets for future direct imaging of exoplanets."

Young red dwarfs produce a telltale glow in the ultraviolet part of the electromagnetic spectrum that Galaxy Evolution Explorer can sense. Because dwarf stars are so numerous—as a class, they account for more than two-thirds of the stars in the galaxy — astronomers could reap a rich bounty of targets.

In many ways, these stars represent a best-case scenario for planet hunting. They are close and in clear lines-of-sight, which generally makes viewing easier. Their low mass



Exoplanets are easier to see directly when their star is a dim, red dwarf.



means they are dimmer than heavier stars, so their light is less likely to mask the feeble light of a planet. And because they are young, their planets are freshly formed, and thus warmer and brighter than older planetary bodies.

Astronomers know of more than five hundred distant planets, but very few have actually been seen. Many exoplanets are detected indirectly by means of their "wobbles" — the gravitational tugs they exert on their central stars. Some are found when they transit the parent star, momentarily dimming the glare, but not dimming it enough to reveal the planet itself.

The new Galaxy Evolution Explorer technique might eventually lead to planets that can be seen directly. That would be good because, as Rodriguez points out, "*seeing is believing.*"

And it just might make astronomers feel a little better about the stars.

The Galaxy Evolution Explorer Web site at...

<http://www.galex.caltech.edu>

...describes many of the other discoveries and accomplishments of this mission. And for kids, how do astronomers know how far away a star or galaxy is? Play "How Old do I Look" on The Space Place at...

<http://spaceplace.nasa.gov/whats-older>

...and find out!

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

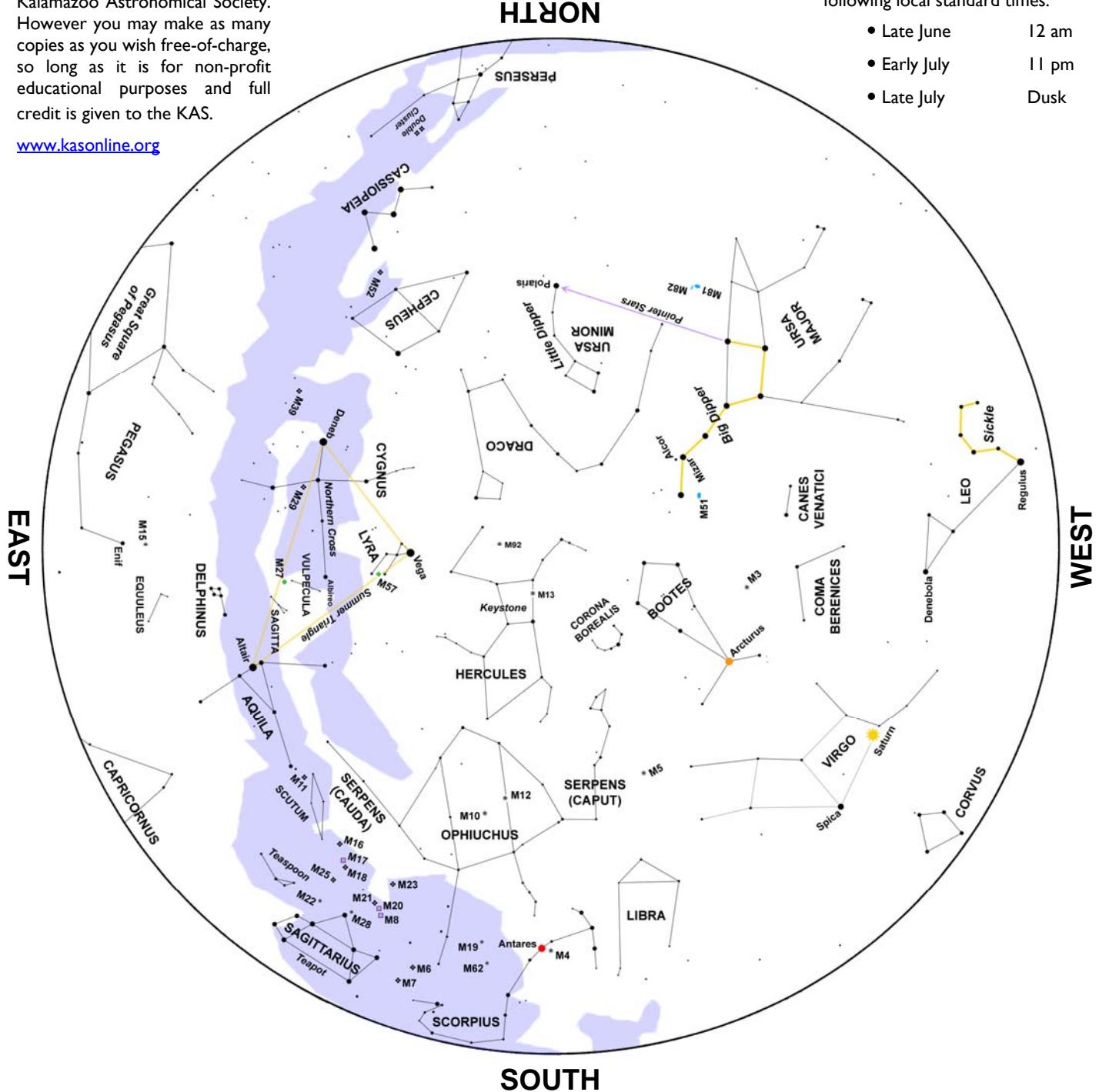
July Night Sky.....

This star map is property of the Kalamazoo Astronomical Society. However you may make as many copies as you wish free-of-charge, so long as it is for non-profit educational purposes and full credit is given to the KAS.

www.kasonline.org

This map represents the sky at the following local standard times:

- Late June 12 am
- Early July 11 pm
- Late July Dusk



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Checkout the ShortTube!



The Kalamazoo Astronomical Society's Orion ShortTube 80mm refractor, mounted on the light and ultra-portable EQ-1 mount, is available for loan.

This little scope gives great wide-field views and can be setup in a snap. Contact the KAS Equipment Manager, **Dave Woolf**, today if you'd like to use it:

e-mail: [go4itbass @ gmail.com](mailto:go4itbass@gmail.com)
phone: (269) 762-8269

Kalamazoo Valley Museum

Planetarium Show Schedule

Secrets of the Cardboard Rocket

Weekdays @ 11am; Sat. @ 1pm; Sun. @ 2pm

Treasures of the Great Lakes

Tues. & Thurs. @ 3pm; Sat. @ 2pm

Galaxies

Mon., Wed., Fri., Sat. & Sun. @ 3pm



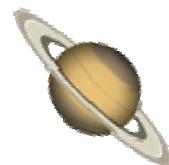
Planetarium admission is \$3.00 per person. The Kalamazoo Valley Museum is located at 230 North Rose Street in downtown Kalamazoo. For more information please call (269) 373-7990 or visit us on the web at www.kalamazoomuseum.org

Public Observing Sessions



Saturday, July 9th

Features: *Saturn & Gibbous Moon*



Saturday, July 30th

Features: *Pleasant Planetary Nebulae*

Gates Open: 9:00pm • Observing Begins: 10:30 pm

Kalamazoo Nature Center • 7000 N. Westnedge Ave.

General Meeting Preview



Golden Age of Amateur Astronomy



presented by **Jason Blaschka**

Technology has made more telescopes, eyepieces, cameras and various other accessories available to us than ever before on just about any budget. Due to the Internet, there is also more information and opinions on what is best, what is worst and what you should buy!

We are going to take a look at the recent trends in amateur astronomy and how that has affected what equipment manufacturers and dealers are producing in response from the points of view of both the users and the vendors. We will then take a look at some of that equipment and hopefully help you start to answer the ever elusive questions of "Where do I start?" or maybe "What should I buy next?".

BONUS: The July meeting is also "Gadget Night"! Please bring along any interesting astronomically themed doodads, doohickeys, and devices you've built or purchased to share with everyone.

Friday, July 8 @ 7:00 pm

Kalamazoo Nature Center - 7000 North Westnedge Ave.

Kalamazoo Astronomical Society
c/o KAMSC
600 West Vine, Suite 400
Kalamazoo, MI 49008

STAMP

