

The Astronews



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SUN/MOON FUNNEL

by John Sandor

A telescopic photo of the setting sun on the back cover of the last issue of the Astronomy League's "Reflector" magazine caught my eye. Reading the caption, I found out how the image was made using a homebuilt "Sun Funnel", and I was intrigued. It showed a device in a telescope's eyepiece holder that seemed to project an image like it was on TV. In the past, I had seen a microscope with a cool viewer at a science museum. It had a 5-inch diameter convex magnifying lens in the focuser which projected the image of the glass slide specimen,

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Upcoming Events:

- ☆The next meeting is 7:30PM on **Tues., Sept 3** at the Bishop Museum.
- ☆Bishop Museum's next evening planetarium shows are every Saturday of the month at 8:00 p.m.
www.bishopmuseum.org/calendar
- ☆The next Board Meeting is Sun., **Sept 1** at 3:30 p.m. at the POST building at UH.



NASA Science News: Sun About To Do A Flip

Something big is about to happen on the sun. According to measurements from NASA-supported observatories, the sun's vast magnetic field is about to flip.

"It looks like we're no more than 3 to 4 months away from a complete field reversal," says solar physicist Todd Hoeksema of Stanford University. "This change will have ripple effects throughout the solar system."

The sun's magnetic field changes polarity approximately every 11 years. It happens at the peak of each solar cycle as the sun's inner magnetic dynamo re-organizes itself. The coming reversal will mark the midpoint of Solar Cycle 24. Half of 'Solar Max' will be behind us, with half yet to come.

A reversal of the sun's magnetic field is, literally, a big event. The domain of the sun's magnetic influence (also known as the "heliosphere") extends billions of kilometers beyond Pluto. Changes to the field's polarity ripple all the way out to the Voyager probes, on the doorstep of interstellar space.

When solar physicists talk about solar field reversals, their conversation often centers on the "current sheet." The current sheet is a sprawling surface jutting outward from the sun's equator where the sun's slowly-rotating magnetic field induces an electrical current. The current itself is small, only one ten-billionth of an amp per square meter (0.0000000001 amps/m²), but there's a lot of it: the amperage flows through a region 10,000 km thick and billions of kilometers wide. Electrically speaking, the entire heliosphere is organized around this enormous sheet.

During field reversals, the current sheet becomes very wavy. Scherrer likens the undulations to the seams on a baseball. As Earth orbits the sun, we dip in and out of the current sheet. Transitions from one side to another can stir up stormy space weather around our planet.



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The Earth had its picture taken by two spacecraft recently. Cassini took a mosaic of Astronomy is a science, but it has its roots in millennia of observations of natural phenomena by ordinary people. Some astronomical information is factual, such as the masses and luminosities of various stars. Some phenomena, such as stellar fusion, are pretty well understood while other things, such as the nature of dark matter and dark energy, are more speculative. Then there are cultural traditions.

While scientists have agreed on the division of the sky into 88 constellations and drawn their boundaries precisely, cultures have assigned different names and stories to the patterns of stars they see. Even within the Greek and Roman traditions that gave rise to many of the constellation names that have become officially adopted, there are no “official” pictures of the characters depicted. We can find many different interpretations of the appearance of Orion, for example.

Cultures are always changing, and cultural references to phenomena change over time. Terms often persist long after their original meaning has been forgotten. One example is the “Blue Moon.”

There are 12 full Moons in most years, but some years have 13. Many cultures gave names to each of the 12 full Moons, but years with 13 full Moons required some kind of adjustment. In such years, one of the seasons would have four full Moons instead of three.

According to Wikipedia, Catholics in England used the Old English term “belewe” Moon, meaning “betrayor” Moon, for this phenomenon when it would have made Lent come too early. So traditionally, the third full Moon in a season with four is designated a “Blue Moon.”

More recently, an article in the March 1946 issue of *Sky and Telescope* misinterpreted the description in an almanac and defined a Blue Moon as the second full Moon in a calendar month. This has become the more popular definition.

Since these are merely customary definitions, either one is appropriate to use. However, they should be used correctly. The August 2013 full Moon was the third full Moon of four this summer. One local news station gave the correct definition. Another called it the fourth full Moon of the season. I'll let you guess which station said which.

Chris



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(*Sun/Moon Funnel continued from page 1*)

allowing more than one person to look through the microscope at a time. I'd fantasized about creating a similar device for a telescope. I don't like electronic devices on my scope and the artificial light of the phone's display is always a negative for astronomy. The “Sun Funnel” does not require any electronics and could be made rather cheaply and simply at home. I followed the article's link to a website in the Netherlands: <http://transitofvenus.nl/wp/observing/build-a-sun-funnel/>

I found detailed instructions for building my own sun funnel. I could not find the exact parts that the online directions called for, so I improvised. The first step was easy: cut off the little tab on the oil funnel's opening. The next step was more challenging. Since the funnel I bought was not quite the same shape and dimension as the one in the online model, I had to figure out how short to cut the funnel's shaft to be able to insert my eyepiece. It reminded me of the first time I performed a circumcision. The first time I did not cut off enough, and my eyepiece would not fit into the funnel, so I had to cut off another segment. But it proved to still not be sufficient. Finally I made a third cut, and then found out that I had cut off too much as the eyepiece just slipped right through. So it was back to the hardware store...

Rule #1 - in any DIY project: you will always need to go to the hardware store more

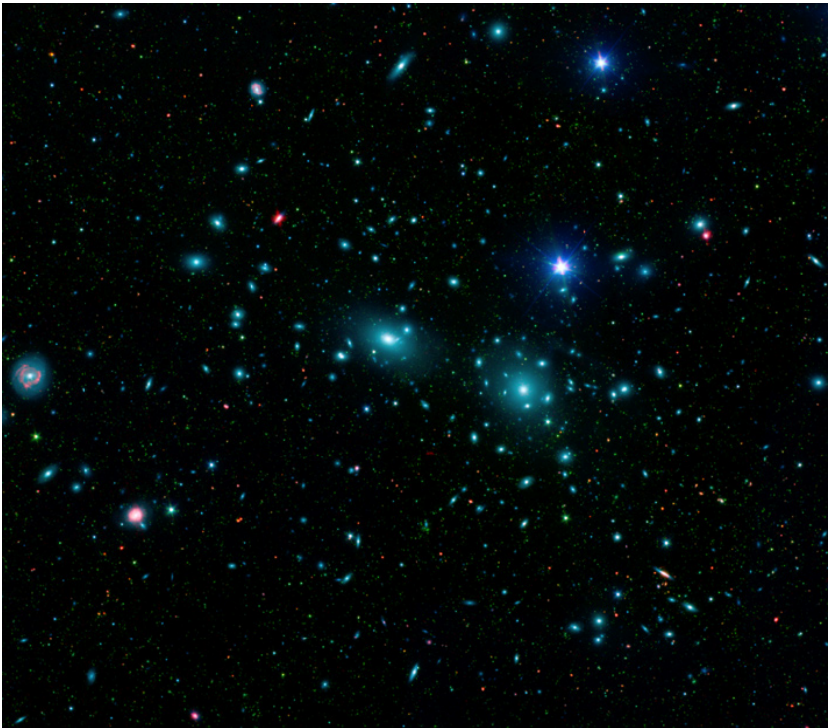
Size Does Matter, But So Does Dark Energy

By Dr. Ethan Siegel

Here in our own galactic backyard, the Milky Way contains some 200-400 billion stars, and that's not even the biggest galaxy in our own local group. Andromeda (M31) is even bigger and more massive than we are, made up of around a trillion stars! When you throw in the Triangulum Galaxy (M33), the Large and Small Magellanic Clouds, and the dozens of dwarf galaxies and hundreds of globular clusters gravitationally bound to us and our nearest neighbors, our local group sure does seem impressive.

Yet that's just chicken feed compared to the largest structures in the universe. Giant clusters and superclusters of galaxies, containing thousands of times the mass of our entire local group, can be found omnidirectionally with telescope surveys. Perhaps the two most famous examples are the nearby Virgo Cluster and the somewhat more distant Coma Supercluster, the latter containing more than 3,000 galaxies. There are millions of giant clusters like this in our observable universe, and the gravitational forces at play are absolutely tremendous: there are literally quadrillions of times the

(Continued on page 9)



Digital mosaic of infrared light (courtesy of Spitzer) and visible light (SDSS) of the Coma Cluster, the largest member of the Coma Supercluster. Image credit: NASA / JPL-Caltech / Goddard Space Flight Center / Sloan Digital Sky Survey.

We had a nice show with the 2013 Perseids this past month. It was really touch and go as far as the weather was concerned. The remnants of Gil had recently passed by and Henrietta was looming to the south of the big island. Despite the odds, a dedicated combined HAS and Meteor group of folks headed for Dillingham airfield the night of August 11/12. Initially we had some cloud cover; some occasional passing clouds, but largely the sky was spectacular!

With the weather cooperating, our group of 20+ could sit back and observe. There were plenty of typical Perseids around second magnitude or fainter. Highlights, at least for me, included several “paired” meteors, one that broke into two parts, another that appeared to skip and meteors that exhibited coloration. The show piece of the evening was the lone Perseid in the east that brightened to roughly -6 (brighter than Venus). Overall, between the start of the session at 11pm until we headed home around 4:30am we tallied a group count of 324 meteors – not a bad nights viewing.

I experimented with my camera during the shower. Modern digital cameras have an amazing array of features to assist you with getting the best shots. I had the foresight to set the camera the day before shower, as I never could have figured out the options in the dark. I settled on an intervalometer option that allowed the camera to take twenty five 30 second pictures every four minutes. Four minutes seems like a long span, but the camera also takes a dark frame exposure to minimize thermal noise on the chip. This is the same process that CCD photographers need to go through when shooting deep sky objects through the telescope. The camera is quiet, thus it’s difficult to know when the shutter is open or closed, and so I didn’t know if I imaged any meteors or not. I was surprised to see that I caught three faint meteors, each on a different frame. <See accompanying image on back cover>

MOON PHASES

New Moon
Sept 5

First Quarter
Sept 12

Full Moon
Sept 19

Last Quarter
Sept 27

Shower	Activity	Max Date	λ 2000	Radiant α	δ	V_{∞} km/s	r	ZHR
Aurigids (AUG)	8/28 - 9/5	Sept 01	158.6°	91°	+39°	66	2.5	6
Sept ϵ -Perseids (SPE)	9/5 - 9/21	Sept 09	166.7°	48°	+40°	64	3.0	5

Meteor pictures are nice, but it’s always better to see them in person!

Tom Giguere, 808-782-1408, Thomas.giguere@yahoo.com

Mike Morrow, PO Box 6692, Ocean View, HI 96737

Planets Close To the Moon

Times are Hawaii Standard Time

Sep 1, 19h, M 6.1° SSW of Mars
(37° from sun in morning sky)

Sep 8, 12h, M 0.76° SE of Venus
(41° from sun in evening sky)

Sep 9, 18h, M 2.5° S of Saturn
(51° from sun in evening sky)

Sep 17, 11h, M 5.4° NNW of Neptune
(158° from sun in evening sky)

Sep 20 03h, M 3.1° NNW of Uranus
(169° from sun in morning sky)

Sep 27, 20h, M 4.9° SSW of Jupiter
(77° from sun in morning sky)

Other Events of Interest

Times are Hawaii Standard Time

Sep 5, 01:35h, Moon new










Sep 13, 01h, 324
Bamberga at Opposition

Sep 18, 06h, Venus 3.5° SSW of Saturn
(43° from sun in evening sky)

Sep 19, 01:12h, Moon full

Sep 22, 10:44h, Fall or Autumn equinox

Sep 24, 15h, Mercury 0.74° NNE of
Spica
(22° from sun in evening sky)

 Mercury Mercury is visible in the evening twilight late in May, but this is a rather poor appearance in the northern hemisphere.	 Venus Shines brightly in the west after sunset.	 Mars Visible in the morning sky before sunrise at a magnitude of about +1.4.
 Jupiter Jupiter is visible shining brightly in the morning sky above Mars.	 Saturn Saturn is in the southwest at sunset and well placed for viewing in the early evening hours.	 Uranus Rises before midnight and can be viewed in the morning sky.
 Neptune Reached opposition last month and is in the sky most of the night. Best observed near midnight.	 Dwarf Planet Pluto Reached opposition on July 1, so this is a good time of year to try to view this 14th magnitude dwarf planet.	 Asteroid Bamberga Reaches opposition on Sep 13 at mag +8.1. At a distance of 0.81 a.u. it will be closer than any other main belt asteroid ever comes.

President Chris Peterson called the August 6, 2013 meeting of the Hawaiian Astronomical Society to order at 7:35p.m. at the Bishop Museum Planetarium. There were 27 members and guests in attendance.

Naked-eye Viewing: Members and visitors ascended to the viewing deck to witness the bright passage of the International Space Station as it passed from southwest to northwest.

Hawaii Space Lecture Series: No lecture was scheduled for August 2013. Call NASA PRPDC at 808-956-3132 or go to <http://www.higp.hawaii.edu/prpdc> for information on upcoming lectures.

Perseid Meteor Showers: *Jim MacDonald* will contact interested individuals for the late night rendezvous at the West Gate of the Dillingham Airfield to view the Perseids pending permission from DOT. This will not open to the public and or advertised.

Tom Giguere and his group plan to view the Perseids from their Central O'ahu location, weather permitting.

"the Conversation": Chris Vandercook of Hawaii Public Radio is looking for items of interest and individuals to interview.

Lacy Veach Day of Discovery: This year's Lacy Veach Day of Discovery is on October 26, 2013 at Punahou School. *Gretchen West* will coordinate the display and volunteers. Anyone interested in helping out please contact Gretchen.

Lecture: Former IfA fellow and astronaut Ed Lu will be giving a talk at UH Manoa Kennedy Theater, 7:30 pm on August 15. The title is "Astronomy Saves the World – Protecting the World from Asteroid Impacts". Contact the IfA for tickets.

Starlight Reserve Committee: *Chris Peterson* reported that the committee started discussions on actual physical reserve areas. Ka'ena Point on O'ahu's North Shore has been suggested as well as a Visitor's Center. Chris suggested that a shielded viewing area be considered adjacent to the Visitor's Center. Chris is asking for input from club members.

Donation: *Joanne Bogan* announced that a Orion Starmax equatorial 127mm scope has been donated to the club. This older scope will be sold as-is. It will be available for viewing at the next meeting. Anyone willing to make an offer should speak to HAS Vice-President *Leslie Galloway*.

Digital Projector: The club is looking into purchasing a digital projector for our use at meetings either in the Planetarium or meeting rooms.

Star Party Report: *John Gallagher* reported there are 2 school star parties in September.

Notes: This is the 1-year anniversary for the Mars rover Curiosity, which has found evidence for conditions that would have been favorable for earthlike life.

The Messenger mission out to Mercury is fairly finished.

A new Mars rover is in the planning stages.

Planetarium: *Joanne Bogan* showed us the NASA animation of the Mars Curiosity landing. She then led us through the night skies of Hawaii, indicating the ISS passes. We were taken on a journey to the Great Orion Nebulae. Joanne ended the night's show with the new show trailer created by the Bishop Museum.

As there was no further business, the meeting was adjourned at 9:05 p.m. Refreshments were served.

Respectfully Submitted,
Gretchen West
HAS Secretary



Hawaiian Astronomical Society

Event Calendar

<div> List View Past Events < September 2013 > Upcoming Events Add/Log Event </div>						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	Labor Day	2 7:30 PM Club Meeting	3	4	5 7:00 PM Under the Stars	6 6:30 PM Public Star Party(D) Sunset: 6:42 PM
8	9	10	11	12 	13 6:50 PM Palolo Elem Star Gazing	14 6:00 PM Public Star Party(G) 6:00 PM Public Star Party(K) Sunset: 6:35 PM
15	16	17	18	19 	20	21 Sunset: 6:29 PM
22	23	24	25	26	27 	28 5:40 PM Club Star Party (D) Sunset: 6:22 PM
29	30	1	2	3	4	5

<<Upcoming Star Parties>>

- Public Party-Dillingham
- Sept 07
- Kahala/Ewa Party
- Sept 14
- Club Only-Dillingham
- Sept 28

☆ ☆

Upcoming School Star Parties

☆ ☆

Fri.	9/06	Lehua Elementary (Pearl City)
Fri.	9/13	Palolo Elementary (Honolulu)
Fri.	10/04	Mililani Uka Elementary (Mililani)
Fri.	10/11	Niu Valley Middle (Honolulu)

(Space Place continued from page 4)

mass of our Sun in these systems.

The largest superclusters line up along filaments, forming a great cosmic web of structure with huge intergalactic voids in between the galaxy-rich regions. These galaxy filaments span anywhere from hundreds of millions of light-years all the way up to more than a billion light years in length. The CfA2 Great Wall, the Sloan Great Wall, and most recently, the Huge-LQG (Large Quasar Group) are the largest known ones, with the Huge-LQG -- a group of at least 73 quasars -- apparently stretching nearly 4 billion light years in its longest direction: more than 5% of the observable universe! With more mass than a million Milky Way galaxies in there, this structure is a puzzle for cosmology.

You see, with the normal matter, dark matter, and dark energy in our universe, there's an upper limit to the size of gravitationally bound filaments that should form. The Huge-LQG, if real, is more than double the size of that largest predicted structure, and this could cast doubts on the core principle of cosmology: that on the largest scales, the universe is roughly uniform everywhere. But this might not pose a problem at all, thanks to an unlikely culprit: dark energy. Just as the local group is part of the Virgo Supercluster but recedes from it, and the Leo Cluster -- a large member of the Coma Supercluster -- is accelerating away from Coma, it's conceivable that the Huge-LQG isn't a single, bound structure at all, but will eventually be driven apart by dark energy. Either way, we're just a tiny drop in the vast cosmic ocean, on the outskirts of its rich, yet barely fathomable depths.

Learn about the many ways in which NASA strives to uncover the mysteries of the universe: <http://science.nasa.gov/astrophysics/>.

Kids can make their own clusters of galaxies by checking out The Space Place's fun galactic mobile activity: <http://spaceplace.nasa.gov/galactic-mobile/> ☆

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(Sun/Moon Funnel continued from page 3)

than once, so start early in the day!

This time I was smart--I bought two funnels. There was a lot of trial and error before I finally figured out how long to leave the funnel shaft and side splits in the shaft. I also discovered that it was better to make two splits in the shaft perpendicular to each other. I finally got the eyepiece to slide into the funnel shaft securely. However, when I tried to clamp it to the eyepiece I found the hose clamp I bought was too large. See Rule Number One. My solution for this was duct tape...

Rule #2 - in any DIY project: you always need duct tape!

Once I got the correct size hose clamp and secured the eyepiece, I moved on to the "screen" portion of the project. The online plan called for Da-Lite Da-Tex (R) rear projection screen material, but I could not find a local source for this. I finally found it online. I only needed a 12" square, and the shipping cost would have exceeded the cost of the material by several times, so the e-tailer suggested I contact the manufacturer to try to get a free sample, which the nice people at Da-Lite did. But I was impatient waiting for it, so started to improvise again. The first screen material I tried was parchment paper (the paper used in baking) and secured it with good old rubber bands. I anxiously inserted the device into my little 3" reflector focus tube and waited for the sun to peek out of the Kaneohe clouds. And voila, the sun appeared, just the right size, and after focusing, even with some sunspots! I was amazed!!

Next, I experimented with my 8" telescope. I knew that it was probably a bad idea, but couldn't resist, and put the sun funnel with the little eyepiece into my large scope and pointed it to the sun. Yes, the image was sharper and brighter, but after a few seconds there was the distinctive smell of burning plastic and puffs of smoke coming from the

HAS Financial Report for the month ending as of Aug. 15, 2013

Initial Balance:	\$4,319.21
<i>Receipts:</i>	
Donations	10.00
Dues Received	102.00
Magazine Payment	66.95
Telescope Fee	20.00
Total Income:	\$198.95
<i>Expenses:</i>	
Astronews	58.17
Magazine Subscriptions	68.00
Trademark Registration	25.00
Postage (Astronews)	59.92
Total Expenses:	\$211.09
Final Balance	\$4,307.07

The club gained three new members this month. They are *Diane Repp*, *Julian Lipsher* and *Christophe Dumont*, a visitor from Belgium. Thank you to *Gretchen West* and *Christophe Dumont* for their donations. Come join us to see what the skies have to offer!

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 From the Editor: This is the *CONCLUSION* of a continuing series contributed by Joseph E. Ciotti, Professor of Physics, Astronomy & Mathematics/ Director of the Center for Aerospace Education, Windward Community College, University of Hawai'i

This article originally appeared in *The Hawaiian Journal of History*, Vol. 45, 2011

HISTORICAL VIEWS ON MAUNA KEA: FROM THE VANTAGE POINTS OF HAWAIIAN CULTURE AND ASTRONOMICAL RESEARCH

CONCLUSION

Informal venues hold the potential to serve as conduits for mitigating cultural differences. At least in this one particular instance, by bringing astronomers and the Hawaiian community together in the safety of an informal environment, the 'Imiloa Astronomy Center has demonstrated initial success in mitigating the controversy over Mauna Kea. If the current success of 'Imiloa Astronomy Center is any indication, other communities experiencing similar disputes— such as, in Arizona over telescopes on Mount Graham or on Maui over Haleakalā's choice for the Advanced Technology Solar Telescope—may consider adopting this facility's approach as a model for overcoming their own differences. ☆

Dillingham Public Star Party - July 27, 2013

The March Dillingham Public Star party was pretty much in line with the last few. There was a large turnout of visitors (including a big group of scouts) at Dillingham for our July Public Star Party, but the weather didn't cooperate at all! It was cloudy with threatening skies, so the evening was called after about an hour of waiting. We were hoping that the skies might miraculously clear and provide a brief glimpse of Saturn for the enthusiastic crowd, but to no avail so we packed up and left at 8:15pm. Hopefully next month will be better.

Dillingham Club Star Party - Aug. 3, 2013

An enthusiastic group of 16 club members came to Dillingham with high hopes of finally getting a break weather-wise and they were not disappointed. After a brief scare of intermittent showers, it cleared to reveal a lovely sky with the Milky Way arching brightly above! Saturn still reigned supreme high overhead. As the Milky Way climbed higher, it got very bright revealing lots of detail. I haven't seen it that bright in many months! For most of the evening the seeing and transparency were very good until after 11pm when clouds started drifting over periodically. About a third of the group exited the site at 10:30pm, but the rest of us stayed until midnight. All in all, it was a most enjoyable star party. Now we're looking forward to the Perseids!

Dillingham Club Star Party - The Perseids (filed by J. MacDonald)

Two hours after the skies cleared, 128 meteors were counted by a member of group that arrived with Tom Giguere. This did not include the various sporadic ones that were not Perseids. Most of the meteors were the short faint ones, but we saw many real bright ones that I would call "fireballs" which left visible trains for a few minutes after passing. Several of us saw colors with a few showing green. I don't think there were any bolides. I estimated that we had 25 people in attendance. About half of the group left at 02:30 a.m.



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(Sun/Moon Funnel continued from page 9)

eyepiece housing. OK, not a brilliant idea! Fortunately it only melted part of the inside of the eyepiece casing and did not damage it beyond use. I then figured out that stopping down my mirror might be a good solution, so I covered the end of the scope with aluminum foil and cut a 1" hole in the foil, gradually enlarging it until the image was bright enough. I found that a 2" opening gave enough light for the solar image projection without causing any significant heating of the optics.

Next, I started experimenting with the screen material. I found that plastic grocery bags made a less grainy image than the waxed paper. The yellow tinted bags from City Mill Hardware gave a pleasingly realistic solar color to boot.

Fianlly my Da-Tex sample arrived, but it was really no better than the plastic grocery bag because it was thicker so the image was not as bright. The bottom line, you just need to purchase the oil funnel and the hose clamp. The whole project can cost less than five bucks (not including the gas for the three-plus trips to the hardware store!).

Epilogue:

The materials and tools you will need are described well in the online article. What you will NOT need is the 5" large hose clamp (substitute with two large rubber bands) nor the Da-Tex projection screen material (use a plastic grocery store bag instead). Oh, and don't forget the duct tape!

John



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Three Perseids - The image is a negative for clarity. Since the meteors were faint and barely visible, each meteor was enhanced for better visibility. Exposure was 30 sec, Nikon D5100, 20mm lens. See Meteor Report on page 5 for more on August's Perseid shower.

Image courtesy: Tom Giguere

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