COMING UP AT
THE OBSERVATORY....

Meet a Meteorite! Nov 1 7p
Astronomy Thursday Nov 6 7:30p
FOTOKids Nov 7 7p
Astronomy Friday Nov 7 7:30p
FOTO Water Works Tour Nov 8 12p
Late Night Date Night Nov 8 SOLD OUT
History Tours Nov 9 1-4p
*FOTO Member’s Meeting Nov 10 7:30p
Cub Scout Pin Night Nov 11 7-9p
Astro Volunteer Training Nov 12 7-9p
Astronomy Thursday Nov 13 7:30p
Astronomy Friday Nov 14 7:30p
Stonelick Stargaze Nov 15 dusk
Late Night Date Night Nov 15 SOLD OUT
Cub Scout Pin Night Nov 18 7-9p
FOTO Planning Meeting Nov 20 7p
Astronomy Thursday Nov 20 7:30p
Astrophoto Workshop Nov 20 8p
Astronomy Friday Nov 21 7:30p
Astronomy Saturday Nov 22 7:30p
Stonelick Stargaze Nov 22 dusk
History Tours Nov 23 1-4p
Astronomy Friday Nov 28 7:30p
Out-Of-This- World Gifts Nov 29 7-10p
Late Night Date Night Nov 29 10:30p
Late Night Date Night Dec 6 10:30p

*Note the monthly FOTO Members Meeting is usually 2nd Mondays - 7:30pm at the Observatory

Save-The-Dates!
Scout Pin Night Dec 6 7-9p
Late Night Date Night Dec 6 10:30p
Luminaria Open House Dec 14 6:30p

THE WORD

By Michelle Lierl Gainey

Hello friends! I hope everyone got a chance to see the lunar eclipse last month; it was beautiful. We did not have so much luck with the partial solar eclipse on Oct. 23; the clouds took over just as the eclipse was about to start. Too bad, as it was otherwise a lovely evening and we had a good turnout at Ault Park.

One of your benefits as a FOTO member is the option to borrow one of our portable telescopes for up to a month. We have both Dobsonian and refractor telescopes available for you to borrow. We want this to be a good experience for you; to avoid difficulties and frustration, please consider taking some training in how to use the loaner telescopes.

Dave Bosse, the chair of the Telescope Loaning Program, has generously offered to meet with any member, one on one, to show you how to care for the telescope, how to align the finder scope, and how to find interesting objects using a star chart. This training will get you off to a good start enjoying the telescope. You can e-mail Dave to schedule a training session: bossejd@ucmail.uc.edu. Of course, if you are an experienced astronomer already, you are not required to take this training before taking a telescope home. If you borrow a telescope and need help learning to find deep sky objects, please consider bringing it to a star party at Stonelick Park (see the Observatory calendar for dates) if the sky is clear. You will find several knowledgeable and helpful fellow astronomers there to teach you.

I hope you will all be able to attend the FOTO meeting on Monday, November 10 at 7:30. Dr. Terry Flesch will be our speaker, sharing his experience of building his personal observatory. Also, Dave Bosse will have some telescope accessories for sale. These are items, including a variety of nice eyepieces, that were donated to COC, and Dave will offer them to FOTO members for a handsomely reduced price before selling them on the internet.
Remember: Our FOTO meeting in December will be the Members’ Appreciation Dinner, on Monday December 8. This dinner will include a chili contest, open to anyone with a great chili recipe, and potluck for other dishes. We will have signups at the November FOTO meeting for who will come and what you will bring. If you cannot attend the November meeting but want to come to the dinner, please contact Aashi Mital at aashimital@gmail.com. We have a limit of 50 people to attend the dinner and the deadline to sign up is Nov. 30.

**FOTO Appreciation Dinner**

By Aashi Mital

Our annual FOTO Appreciation Dinner is just around the corner! The event is being held on Monday, December 8th at 6 p.m. in lieu of the regularly scheduled monthly membership meeting.

We are doing a combination of a chili cook-off and potluck dinner. Everyone should plan to bring something for the event. Remember that the dinner is first come, first served and we have room for **50 people only.** FOTO Members may register throughout November, but they must be registered by November 30th.

We will also be setting up and decorating for the Appreciation Dinner on Monday, December 1st at 7 pm so any additional help is always welcome.

The decoration committee sign-up, FOTO Appreciation RSVP form and food sign-up forms will be passed around at the November FOTO Membership Meeting, Monday, November 10th.

If you are unable to attend the November Membership meeting and wish to sign-up for decorating, bringing food or RSVP, then contact Aashi Mital at aashimital@gmail.com.

**Late Night Date Nights**

Saturday, November 29
Saturday, December 6
10:30 pm to midnight

Are you a night owl? Looking for a romantic Saturday night out under the stars? Come see what the Observatory is like after hours. You’ll get to use the oldest big telescope in the U.S. to view astronomical objects that are not visible until late at night (weather permitting). Get a sneak preview of the next season’s planets and stars a month or two ahead of everyone else.

For adults only. If the weather does not permit viewing, we’ll have fun with some of the crazy science experiments and show you around the Observatory.

Admission is $10 per person

To make reservations sign up online or call 513-321-5186.

**Astro Evenings at the Observatory**

Thursdays, November 6, 13, 20
Fridays, November 7, 14, 21, 28
7:30-9:00 pm

A core program of the Observatory is our ongoing Astro Evenings.

The evenings are all volunteer staffed and include a short presentation on fascinating and ever-changing topics followed by a guided stargaze (weather permitting) through the oldest public telescope in the United States.

There is plenty of time for Q&A on any astro topic and a historical tour of the observatory, where you’ll not only see how the old telescopes work but also learn about the role that Cincinnati has played in the birth of astronomy in America.

**Free for Observatory members!** For the latest schedule see the web calendar then sign up online.

**Did You Know...**

Meteor Crater in Arizona was not caused by a direct meteor impact, but rather from a low altitude air burst. The explosive force was estimated at 1 to 10 megatons of TNT.
**FOTO Kids**

By Aashi Mital

We hope you that you had the opportunity to enjoy and observe the eclipses last month. Are you ready for another round of astronomical awesomeness? Mark your calendars because the next FOTO Kids meeting is on **Friday, November 7th** at **7 pm** in the **Herget Building**.

Remember to dress for the weather! If you have any questions, please email Aashi Mital at aashimital@gmail.com or Aaron Eiben at aaron@cincinnatiobservatory.org.

Until then, keep looking up!

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**History of the Observatory**

November 9 & 23rd

Drop in anytime between 1-4 pm

From 1947 until his retirement in 1978, Paul Herget was the director of the original Minor Planet Center at the Cincinnati Observatory.

$5 per person suggested donation. Free for members. Group tours by appointment.

---

**Did You Know. . ..**

The destiny of the Universe lies in the ashes of dying stars.
Welcome
New & Renewing
Members!

Asif Alikhan
Amy and Scott Avera
Diana and Louis Batsch
David A. Blevens
Bill and Ellen Camm
Robert Michael Cantor
Erin M Cavanaugh
Jo Ann Coors
Joan Gilmore
Buck Hausman
Adam and Melissa Helton
Ann and Tom Hennessy
Donald Kunkel
Scott Gainey and Michelle Lierl
William and Kathleen Moorman
Amy Murdoch
Matthew Nebel
George Ostrum
Lorna Zwerin Parson
Louis Prince
Greg Ries
Valerie Scott
Jon & Jacqueline Seymour
Ronald Gough and Vicki Shepherd
Brian Shiff
Dr. Gerald A. Shubs
Kayla Springer
Robert Stenton
Thomas and Mary Syzek
Nicole Williams
Dean and Marcia Wochner

Highlights of the October
FOTO Meeting

By John Barnes

The October 13 FOTO Meeting, held at the COC, was called to order by President Michelle Gainey.

We had two first time attendees: Gene Gardner and his 11 year old grandson, Ruben Gardner.

Elections were held for 2014 – 2015 officers. Election Committee chairperson Frank Huss, with assistance from John Blasing, conducted the elections.

Here are the new officers

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
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<tbody>
<tr>
<td>President</td>
<td>Michelle Gainey</td>
</tr>
<tr>
<td>Vice-President</td>
<td>Aashi Mital</td>
</tr>
<tr>
<td>Secretary</td>
<td>George Ostrum</td>
</tr>
<tr>
<td>Treasurer</td>
<td>Al Scheide</td>
</tr>
<tr>
<td>Trustee</td>
<td>Dave Bosse</td>
</tr>
<tr>
<td></td>
<td>and Chris Kean</td>
</tr>
</tbody>
</table>

The Board decided, at their September meeting, that this year’s holiday dinner will be a chili contest/pot luck affair. Members are encouraged to bring homemade chili for the competition or another dish for sharing.

Aashi announced an upcoming field trip: The Cincinnati Water Works Tour on November 8. She will provide a suggestion box at future meetings so that members may submit ideas for additional field trips.

Dale Zoller gave us a review of this September’s Scope Out. Thank yous were given to several volunteers who went to special efforts to make this year’s event a success. The first winner of the Tesla test drive was Jim Groen, who declined. In a second drawing John Blasing was the winner.

Dave McBride introduced the speaker, Jerry Black, Chairperson of the Ohio Chapter of The Mars Society. Jerry’s talk was The Search for Life on Mars and Beyond.

The treasurer’s report showed no expenses during the last month. The bank balance is $3,691.47.

John Ventre announced that we are in need of more telescope pointers.

Frank Huss announced that the library is ready to sign out books.

Aaron Eiben has collimated some of the loaner scopes. Keeping finder scopes aligned continues to be a challenge.

Dave Bosse is starting his Astronomy A to Z Classes in January. The classes will meet on the third Sunday of the month for all of 2015 and are free to FOTO members.

The next FOTO meeting will be on November 10 at 7:30 pm, when the speaker will be Dr. Terry Flesch with a talk about the design and construction of his private observatory.

For Sale

Telescope for Sale by FOTO member Don Gorth.

Celestron CPS 800 telescope with extra eyepieces, two power packs, a dew shield, and a soft sided case. New condition. I will sell it all for $1500.

Phone 513-276-9096 or email drel3@yahoo.com

Did You Know. . .

An international team of astronomers has found that Neptune's south pole is warmer than other parts of the planet.
Monthly FOTO Planning Meeting

By Michelle Gainey

The next FOTO Planning Meeting is scheduled for Thursday, November 20 at 7 PM at the Observatory. The planning meetings are open to all FOTO members. We encourage your participation in the discussion of future FOTO activities.

FOTO Canned Goods Drive

By Aashi Mital

With the season of giving quickly approaching, we thought it would be a good idea to host a canned goods drive at the Observatory. Bring a canned good with you on the night of our FOTO Appreciation Dinner (Monday, December 8th at 6 p.m.) to help those in need.

Donations include your typical non-perishable items, however, the items most needed by Freestore are: peanut butter, canned fruits and vegetables, cereals, canned salmon, tuna and chicken, soups, spaghetti sauce, canned fruit juice, canned dry and evaporated milk, dessert box mixes and pasta.

Money (cash and check) donations will also be gladly accepted. Please make sure checks payable to Freestore Food Bank. All of our proceeds shall benefit the Freestore Food Bank (located Downtown).

If you cannot attend the FOTO Appreciation Dinner and wish to make a donation, please contact Aashi Mital aashimital@gmail.com

Ozone Hole Update

Oct 30, 2014: The Antarctic ozone hole reached its annual peak size on Sept. 11, according to scientists from NASA and the National Oceanic and Atmospheric Administration (NOAA). The size of this year’s hole was 24.1 million square kilometers (9.3 million square miles) – an area roughly the size of North America.

The largest single-day ozone hole ever recorded by satellite was 29.9 million square kilometers (11.5 million square miles) on Sept. 9, 2000. Overall, the 2014 ozone hole is smaller than the large holes of the 1998–2006 period, and is comparable to 2010, 2012, and 2013.

A2Z Astronomy Class

Nothing You Can See That Isn’t Shown

By Dave Bosse

Preparations continue for the restart of the monthly A2Z Astronomy classes, beginning again on January 18th. The first class will be all about YOU. That is to say, You the Observer.

What IS seeing? What about atmospherics? And what the heck is Averted Vision? Stellar Aberration? What do we mean by “The Sky”? These are just a few of the topics that will be covered in January’s class.

There is also bound to be much more breaking news to discuss what with ESA’s Philae lander touching on Comet Churyumov…, no, Churyomenski…, no, Charlie Gerryminski…, oh heck, Comet 67P/C-G, yeah, that’s the ticket. That happens this month and we have encounters with Dwarf Planets Ceres and Pluto later in 2015. (Comet 67P/Churyumov–Gerasimenko)

The A2Z Astronomy classes will be held the third Sunday of each month at 7:00 pm in the West Wing of the Herget Building. The discussion group (participation is thoroughly encouraged) will meet for about an hour or so and the best part is that attendance is free to any COC member. There are absolutely no pre-requisites other than the desire to learn. Pay attention to this space over the next few months for more details on upcoming classes. (Pardon the John Lennon reference in the article title.)

Did You Know….

A Black hole has no more vacuuming power than a regular star.
October provided solar observers with the best, biggest, most active region of sunspots and flares of Solar Cycle 24. On October 17, a very large sunspot complex began to rotate into view on the Sun’s southern hemisphere. It was already many times larger than the Earth. The next day the region was labeled AR 2192. For the next 13 days the region rotated across the Sun getting larger by the day. Solar flares were cracking around the sunspots. A few x-flares were observed but thankfully none produce damaging results to the Earth or our space environment.

The sunspot region could be seen without a telescope by observers around the world. It ranked in size with regions seen in 1947 and 2001. So this active region was one for the record books. I think we will get another look when it returns from the back side of the sun. Big active regions such as this may be visible for two or three rotations around the Sun. I know I will be watching the solar limb around November 15th to see if the giant will give us an encore performance.

Craig’s Corner

By Craig Niemi, Executive Director

Our sincere thanks go out to Lyn Marsteller for all her great work as the Observatory’s Development Coordinator. Lyn is making time for travel and all her other pursuits.

Much of our success in fundraising came from her work with local foundations, grant writing and most importantly cultivating individual donors.

Lyn’s experience and knowledge of the Observatory goes back to day one and is invaluable. Lyn has generously offered to continue on as a volunteer on the Development Committee.

COC trustee Dr. Jenny O’Donnell is now chairing the Development Committee and brings her own experience and fervent passion for this remarkable place. There is no doubt that great things are going to happen under her leadership.

The search for a new development director is under way. We’ll have more about that soon.

If you’ve visited recently you’ve probably seen some changes. Or maybe you haven’t noticed, which is actually the goal.

The University of Cincinnati’s architect’s office is helping with the much needed repairs to the steps and porches of both buildings. Stopping water penetration is paramount to keeping up the architectural elements of the entrances and spaces beneath.

Also the dilapidated trip-hazard of a sidewalk from Weston Place has been removed and the area graded and reseeded. It’s
great to be working with UC and all the resources they bring to our mission of preserving this National Landmark.

Coming up on December 14th is our annual Luminaria Holiday Open House. In partnership with the Mt. Lookout Community Council we’ll once again offer carolers, tours, refreshments and trips to and from Mt. Lookout Square along luminary lit streets.

Hope to see you on the 14th!

FOTO Greater Cincinnati Water Works Tour

By Aashi Mital

FOTO is headed to Greater Cincinnati Water Works for a private Riverside Station Tour on Saturday, November 8th. The tour starts at noon (arrival at 11:45 a.m.). The address is 5651 Kellogg Ave., Cincinnati, OH 45228. A Photo ID will be required at the gate.

Our tour will be about 90 minutes with minimal walking. Pictures are most certainly encouraged, but space will be minimal. Please remember that closed toe and closed heel shoes required. Remember to wear rubber sole shoes only. Older clothes and long pants are suggested. Be informed that there are limited restrooms onsite (Port-A-Potty).

Keep an eye out for reminder and detailed emails. If you have any questions, please email Aashi Mital at aashimital@gmail.com .

Did You Know. . .

Asteroids often travel in pairs.
**Luminaria Night Holiday Open House**

Sunday, December 14th
6:30-8:30 pm

Join in the festivities!
Ride to and from the Observatory and Mt. Lookout Square along Luminaria lit neighborhood streets.

The Observatory will be open for tours and Q&A. *Forte* (pictured above) will again treat our visitors to holiday carols.

The gift shop will be open and a number of special vendors will be on hand with hand-crafted items. Hot drinks & holiday treats will be available.

Free. No reservations needed.

**FOTO's November Meeting**

*By Dave McBride*

Autumn continues to have some of the best sky events. Sometime in November the ESA’s Rosetta spacecraft is scheduled to release its Philae lander. Philae will attempt to land on the surface of a comet known as 67P/Churyumov-Gerasimenko. It will spend about a week studying the comet. It will send back images from the surface and try to determine what the comet is made of.

Look for the South Taurids Meteor Shower on November 5 & 6. Viewing may be frustrated by the full moon on the 6th. The Leonid Meteor Shower will appear on November 17 & 18. It will be an average shower, producing an average of up to 15 meteors per hour at its peak.

For our membership meeting on November 10th at 7:30 pm, we will have a presentation by *Terry Flesch* on his topic “Waltonfields Observatory - The Construction and Use of a Personal Observatory.” Terry will tell us the story of his homebuilt observatory in Walton, KY. He has been operating it for 10 years and will share some of the observations he’s made with his equipment, along with photos of the construction of the building. Terry’s non-technical presentation will help everyone relate to his personal experience.

Also watch for information about our December volunteer appreciation dinner.

**Astro Volunteer Orientation**

Wednesday, November 12th
7:00 pm-9:00 pm

Volunteers are key to the success of the Observatory! Our talented and dedicated volunteers host most of the public programs, special events and rentals held throughout the year; assist Dean and Aaron with school programs; offer history programs and research the history of the Observatory.

Want to learn more about volunteering at the Observatory or sign up for the next orientation session? Contact John Ventre at 513-321-5186.

**Eyes of the Night**

Mr. John Ruthven is offering signed, limited edition giclee’ prints of his "Eyes of the Night" which features the Observatory!

Each signed 14"x 20" print is on sale for $150. The total run will be limited to 250 prints. Proceeds support the Observatory’s programs.

To order contact Craig Niemi at 513-321-5186 or craig@cincinnatiosbervatory.org
It seems that a few weeks ago, Pope Francis stated that in the face of overwhelming scientific evidence, evolution was real and (more importantly for astronomers) the Big Bang really happened. Wow, this is news! Fifty year old news for us, but news indeed. But what is that overwhelming evidence? It all started half a century ago with one of the most bizarre sequence of events in the history of modern science.

Arno Penzias and Robert Wilson were radio engineers for Bell Labs (owned by AT&T) who, in the mid 1960's (1965 is when they made their discovery) were trying to identify the best frequency ranges to use for long distance telephone transmissions.

Microwave transmissions would be far more efficient than that old-fashioned wire stuff. Using copper hard-wired connections to communicate across the country was kind of pricey and any single piece of copper could only handle a few hundred phone calls before cross-talk just got too noisy. This was in the days before digital communications and the use of analog techniques for conversation isolation was purely frequency range shifting.

Bell Labs had long before determined that 300-3000 hertz was plenty broad enough frequency range to handle the human voice. Not violins or Pavarotti, but higher resolution really wasn't necessary to talk to Grandma in San Francisco. Some of us are old enough to remember long distance calls with unintelligible "ghost" conversations in the background.

If AT&T wanted to handle more long distance calls with better isolation, they would have to lay more and more copper. Microwave frequency carrier transmissions could handle a greater number of calls per channel and the microwave airways would be free. Microwave tower to tower transmissions have to be line-of-sight, so there would be a limit of some several dozens of miles between towers. Building a repeater tower every 30 or 40 miles was a heck of a lot cheaper than a couple of million pounds of copper plus getting it laid down (and it eventually rots away and it is susceptible to back-hoes and other human intrusions).

So it was their (Penzias & Wilson) research, running through many frequencies searching for low noise ranges that would prove useful that led them to find a tremendous amount of noise at a wavelength of 7.35 centimeters, about 100 times "louder" than what they would have expected given their experiences at other frequencies. They didn't think much of it and tried to find its source,... the Sun, Jupiter, the Milky Way, pigeon poop,... no dice; just finding that it came from everywhere. Oh well, don't want to use that frequency. This is where it gets serendipitous.

Dicke, Peebles and Wilkinson, at Princeton University, had prepared a paper for publication (Astrophysical Journal Letters) indicating that if the Big Bang had really occurred, it should have left some kind of blast energy radiation and because of the red-shift of space, it should be "visible" somewhere in the 6 or 7 cm wavelength (microwave) range. Bernard Burke at MIT had seen a pre-print of the article and just happened to be a friend of Penzias. Burke suggested that Penzias give Dicke a call at Princeton to let them know what they had found. I believe that Dicke's comment after the phone call was something like "Well, boys, we've been scooped!"

They all agreed to co-publish two papers at the same time, July 1965; the Princeton boys' paper saying that the Cosmic Background Radiation should be detectable in the microwave range and Penzias and Wilson's paper "A Measurement of Excess Antenna Temperature at 4080 Megacycles." The evidence Pope Francis speaks of.

Dicke, Peebles and Wilkinson did all the work of predicting where they should look and were actually in the late stages of designing a device to try to detect the relic radiation. They dropped the whole project; Penzias and Wilson get the Nobel Prize in 1978. Go figure. How does that saying go,... Even a blind squirrel...

Don't get me wrong, Arno Penzias and Robert Wilson were brilliant, tenacious engineers and definitely deserved the Prize. To be working with just the right tool (the Crawford Hill Horn Antenna) and accidentally make the most important discovery of the 20th century, wow! Good support for "I'd rather be lucky than good." Penzias and Wilson were lucky. Pope Francis was good.
**Meteorites on Display**

*By Aashi Mital*

The next time you are in the Herget Building, take a look at the Meteorites Exhibit in the rotunda. This is just the latest rotating exhibit on display and would make for an excellent resource for those of us at the Observatory. Between incorporating it into presentations for our weekly programs to being an added intrigue for walk-ins and tour groups, it is yet another way to engage with the general public. If you haven’t had the opportunity to check out the new exhibit yet, it will be on display until mid-January.

**Museums and Historic Sites of Greater Cincinnati**

MHS is comprised of over 30 participating sites across Greater Cincinnati. Each site offers a unique perspective on local history and culture through public programs, exhibits, lectures, and tours.

www.historicgreatercincinnati.org

**Greater Cincinnati STEM Collaborative**

The Greater Cincinnati STEM Collaborative (GCSC) impacts STEM (Science, Technology, Engineering, and Mathematics) learning and career readiness through active, engaged, data-driven partnerships between business, educational (Cincinnati Observatory), and community partners. Our vision is that the Greater Cincinnati, tri-state region has the most robust STEM talent pipeline in the country which is also representative and inclusive of the region’s population.

www.greatercincystem.org

**Amazon “Smiles” on the Observatory**

Amazon will donate 0.5% of the price of your eligible purchases to Cincinnati Observatory Center whenever you shop on AmazonSmile. Next time you shop at Amazon simply start at http://smile.amazon.com/ch/31-1665954

**Did You Know...**

**Hyperrnovas** are at least 100 times the mass of our Sun. When fusion stops in a Hypernova, it explodes and what’s left is a new super massive black hole and two jets of incredible energy called Gamma Ray Bursts.

**Planet Discovered That Won't Stick To A Schedule**

For their latest discovery, astronomers have found a low-mass, low-density planet with a punctuality problem. The new planet, called PH3c, is located 2,300 light years from Earth and has an atmosphere loaded with hydrogen and helium. Its inconsistency kept it from being picked up by automated computer algorithms that search stellar light curves and identify regular dips caused by objects passing in front of stars.

http://www.sciencedaily.com/releases/2014/10/141030133356.htm

**Meet Me Outdoors**

Looking for one site to find this autumn’s best outdoor recreation events?

http://meetmeoutdoors.com
Hubble Sees 'Ghost Light' From Dead Galaxies

The universe is an infinite sea of galaxies, which are majestic star cities. When galaxies group together in massive clusters, some of them can be ripped apart by the gravitational tug of other galaxies.

Astronomers using the Hubble Space Telescope to probe the massive galaxy cluster Abell 2744 — nicknamed Pandora's Cluster — have found forensic evidence of galaxies torn apart long ago. It's in the form of a phantom-like faint glow filling the space between the galaxies. http://www.sciencedaily.com/releases/2014/10/141030132949.htm

New Solar Power Material Converts 90 Percent of Captured Light into Heat

The new material can also withstand temperatures greater than 700 degrees Celsius and survive many years outdoors in spite of exposure to air and humidity. http://phys.org/news/2014-10-solar-power-material-percent-captured.html#jCp

Infant Solar System Shows Signs Of Windy Weather

Astronomers have observed what may be the first-ever signs of windy weather around a T Tauri star, an infant analog of our own Sun. This may help explain why some T Tauri stars have disks that glow weirdly in infrared light while others shine in a more expected fashion. http://www.sciencedaily.com/releases/2014/09/140922152912.htm

Planet-Forming Lifeline Discovered In A Binary Star System

Scientists have detected a streamer of dust and gas flowing from a massive outer disk toward the inner reaches of a binary star system. This never-before-seen feature may be responsible for sustaining a second, smaller disk of planet-forming material that otherwise would have disappeared long ago. http://www.sciencedaily.com/releases/2014/10/141029141221.htm

55142 is the Kroger Community Rewards number for the Observatory

After a quick and easy sign up online, every time you swipe your Kroger Plus Card a donation goes to support the Observatory’s mission. No cost to you; no loss of fuel points. https://www.kroger.com/account/create

Fifteen Years Of NASA's Chandra X-Ray Observatory

Hydra A is a galaxy cluster that is 840 million light years from Earth. The cluster gets its name from the strong radio source, Hydra A, that originates in a galaxy near the center of the cluster. http://phys.org/news/2014-10-fifteen-years-nasa-chandra-x-ray.html#jCp