



The Prairie Astronomer

March, 2010

Volume 51, Issue #3

The Official Newsletter of the Prairie Astronomy Club

PAC Program

Dr. Jack Gabel's research involves Quasars. Gabel has collaborated with Martin Gaskell (a former member of PAC who is now at the University of Texas - Austin) in Quasar research and he is on several research papers with Gaskell. Quasars (AGNs) are connected with black holes, especially supermassive black holes which are huge sources of outpouring energy. Dr. Gabel will give us an overview of Quasars and his research.

In This Issue

Observing in April, Focus on Constellations, MSRAL Convention, Outreach Report, PAC History Book, Taking the Pulse of a Supernova, Hyde PV energy production results.

Featured Photo

From Rick Johnson: "Arp 312 is a group of galaxies in northern Hercules located about 525 million light-years away. While the galaxies of Arp 312 have about the color of elliptical galaxies they are a bit bluer than most leading me to wonder if these were spirals and have interacted sufficiently to eject their dust and gas so are turning into elliptical galaxies. I find very little on this group so this is pure speculation on my part."

Please send your astrophotos to Mark Dahmke to be added to the PAC website and the newsletter.



Club Business

Minutes from the February Meeting

Announcements:

Dan Delzell called the meeting to order.

The next PAC star parties will be on Mar. 5 & 12

The next PAC meeting will be Tuesday March 30, 7:30

PM at Hyde. It will feature information from Jack Gabel about his research on black holes and quasars.

April 24th is Astronomy Day

The Nebraska Star Party is August 8th through 13th, 2010.

Observing Chair Report

Club Observing Chair, Jim Kvasnicka provided a review of recent star party activity and a preview of March's observing highlights. Jim also presented that the planets Mercury, Venus, Mars, and Saturn will be visible at night and Neptune and Jupiter in the morning 2010 is also the 30th anniversary of the first mass produced dobsonian.

It came with a 13.1 inch mirror and costs \$395.

The Galileo Scopes have arrived and you can pick your scope up if you ordered one.

If you are able we would like to have all members have some sort of PAC apparel for MSRAL. Contact Dan with orders so we can place a group order.

March 1st, 2010 Pac Board Meeting Minutes

Program Review:

Talked about picking better night for bad movie night, lunar party. Or special night just for new astronomers for a lunar party. Would like to have everyone sign in for meetings. Have new members be featured on the newsletters. Have a new members star party to show how to run their telescopes.

May 21st will be a lunar star party for our new members.

April, May, & June Meetings:

April will be a video.

May will have Jack talk about Clay's Shuttle launch

June will Mark talk about May's Shuttle launch/pot luck

Cost of PAC book

Reprint cost of articles, photos, news clippings from journal star. We might be able to get a free ISBN number for the book. How many we need to order and if sales tax needs to be included in the price.

Shirts: PAC shirts group order for MSRAL.

-NSP?

Club telescopes and equipment.

White refractor was damaged by the public.

Cabinets on the deck for storage of telescopes.

PAC will donate the cabinets on the deck after MSRAL

We will start to list in the newsletter who currently has the telescopes.

Cleaning for MSRAL: Jack will get notice to Parks and Rec to clean and paint deck and refinish the deck floor.

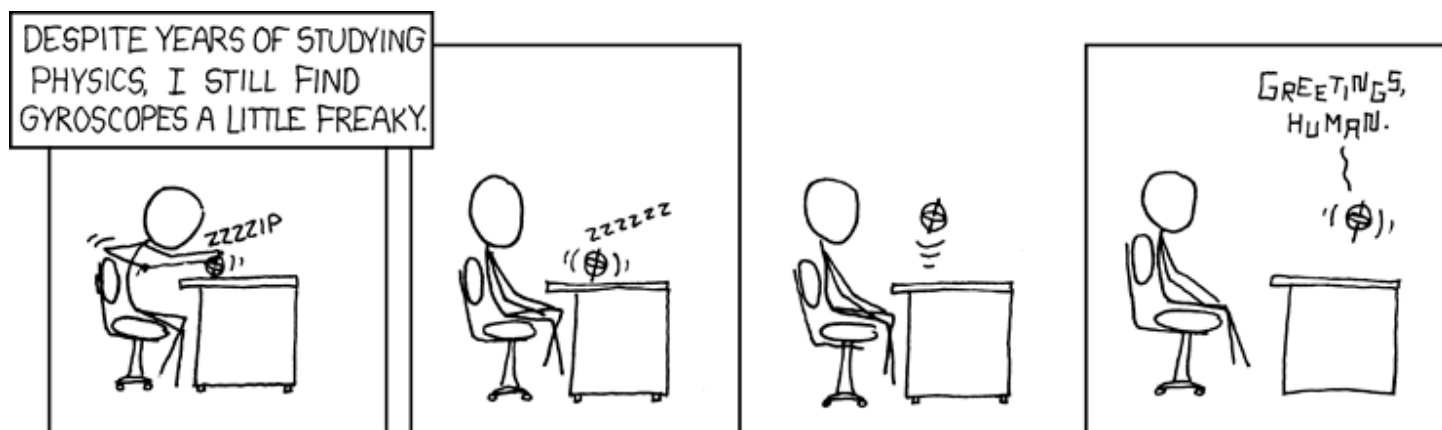
Astronomy day: April 24th. We will be giving away a 6in dobsonian.

Door prizes for MSRAL: Eyepieces and filters will be given away.

During MSRAL: Tours of Hyde will be given during the Star B Que. Please register at Hyde for the Star B Que. Deck will be open Friday

Galileo Scopes

We will be giving away 1 PAC and 1 Hyde Galileo scope every Saturday.



Cartoon From XKCD

Club Events

Newsletter submission deadline, April 18, 2010

PAC Club Meeting

Tuesday, March 30, 2010 7:30pm @ Hyde Obsv.

Speaker: Jack Gabel, topic will be black holes and quasars.

PAC Club Meeting

Tuesday, April 27, 2010 7:30pm @ Hyde Obsv.

2010 PAC Star Party Dates

April	9 th & 16 th
May	7 th & 14 th
June	4 th & 11 th
July	2 nd & 9 th
August	6 th & 13 th
September	3 rd & 10 th
October	1 st & 8 th
November	Oct 29 th & 5 th
December	3 rd & 10 th

2010 PAC Lunar Party Dates

April 23rd, May 21st, June 18th, July 16th, September 17th, October 15th,
November 12th

Astronomy Day 2010 is April 24th.

2010 Convention of the Mid-States Region Astronomical League

(MSRAL) June 4th, 5th, 6th at UNL

Nebraska Star Party

August 8th – 13th Merritt Reservoir South of Valentine, NE

Volunteer Activities

Astronomy Day – April 24th

Spring Creek Prairie Twilight on the Tallgrass – September (date not set)

Homestead National Monument Halloween on the Prairie – Sat. before
Halloween

Hyde Observatory on Saturday nights

Additional volunteer events will occur when they are scheduled.

ON THE NET

PAC:

www.prairieastronomyclub.org

PAC E-Mail:

info@prairieastronomyclub.org

NSP:

www.nebraskastarparty.org

NSP E-Mail:

info@nebraskastarparty.org

OAS

www.OmahaAstro.com

Hyde Observatory

www.hydeobservatory.info

Panhandle Astronomy Club

Panhandleastronomyclub.com

PAC-LIST: You may subscribe to the PAC listserv by sending an e-mail message to: imailsrv@prairieastronomyclub.org. In the body of the message, write "Subscribe PAC-List your-email-address@your-domain.com"

For example:

Subscribe pac-list me@myISP.com

To post messages to the list, send to the address

pac-list@prairieastronomyclub.org

PAC can also be found on Twitter and Facebook.

Buy club apparel through the club website. Shirts, hats, mugs, mouse pads and more.



April Observing: What to View--Jim Kvasnicka

April Observing: What to View

By Jim Kvasnicka

This is a partial list of objects visible for the upcoming month.

Planets

Venus: Shines at magnitude -3.9 in the west.

Mercury: To the lower right of Venus. On April 4th the two are 3° apart.

Mars: In Cancer, its magnitude will decrease from 0.2 to 0.7 in April. From April 16th to the 18th Mars is 1° north of M44, the Beehive Cluster.

Saturn: Just above the head of Virgo, visible all night.

Jupiter: Low in the east at dawn and rises about an hour before the Sun to start April.

Neptune/Uranus: Both are difficult to see at dawn.

Meteor Showers

Lyrids: April 21-22, the waxing Gibbous Moon will interfere. Expect 5-15 per hour.

April Messier List

M40: Pair of stars in Ursa Major.

M65/M66: Galaxies in Leo, part of the Leo Triplet Group.

M95/M96: Galaxy pair in Leo.

M97: The Owl Nebula in Ursa Major.

M105: Galaxy in Leo, close to M95 and M96.

M106: Galaxy in Canes Venatici, oval patch of light.

M108: Galaxy in Ursa Major, thin streak.

M109: Galaxy in Ursa Major, small oval patch.

Last Month: M41, M44, M46, M47, M48, M50, M67, M81, M82, M93

Next Month: M49, M51, M61, M63, M64, M85, M94, M101, M102, M104

NGC and Other Deep Sky Objects

NGC 2841: Elongated galaxy in Ursa Major.

NGC 2903: Bright galaxy in Leo.

NGC 3109: Faint, elongated galaxy in Hydra.

NGC 3521: Oval shaped galaxy in Leo.

NGC 3628: Part of the Leo Triplet Group with M65 and M66.

Double Star Club List

Alpha Leonis: Regulus. White and yellow pair.

Gamma Leonis: Algieba. Pair of yellow stars.

54 Leonis: Yellow primary with a greenish secondary.

Alpha Canum Venaticorum: Cor Caroli. Blue-white and

greenish pair.

Zeta Ursa Majoris: Mizar. Pair of white stars.

Gamma Virginis: Porrima. Close yellow pair.

24 Comae Berenices: Yellow primary with a pale blue secondary.

Delta Corvi: White primary with a rose colored secondary.

Challenge Object

Abell 1656: Coma Berenices galaxy cluster. Very rich; 400 million light years away. The brightest member is NGC 4889.



Mid-States
Regional
Convention
June 4-5
2010
Lincoln, Nebraska
www.msral2010.info

The poster features a dark background with a stylized map of the Midwestern United States in blue and white. A circular logo for the Mid-States Regional Convention is visible, along with a large, semi-transparent '2010' and a depiction of the Earth's horizon.

Focus On Constellations - Jim Kvasnicka

Leo

Leo, the Lion is one of the most distinctive constellation patterns in the sky. The head and forequarters of the Lion are marked by the asterism called the sickle. Leo, as is typical of constellations off the Milky Way, contains many galaxies. A number of them are large and bright. Leo contains five galaxies with Messier numbers: M65, M66, M95, M96, and M105. The constellation also contains several interesting double stars. One of them Algieba, Gamma Leonis, is one of the finest double stars in the sky. Leo contains the radiant of the Leonid meteor shower, which peaks every year around November 17th. The constellation Leo is best seen in the month of April.

Mythology

In Greek Mythology the celestial Lion was associated with the Nemean Lion slain by Hercules as the first of his Twelve Labors. The Greeks inherited the Lion from the Babylonians before them. A common theme in Babylonian art is a battle between a Lion and a Bull with the Lion always coming out on top. This may have been the expression of the astronomical fact that the Bull, Taurus, sets as the Lion, Leo, transits the median.

Objects Magnitude 12.0 and Brighter

Galaxies: M65, M66, M95, M96, M105, NGC2903, NGC3521, NGC3628, NGC3384, NGC3607, NGC3227, NGC3489, NGC3377, NGC3640, NGC3412, NGC3608, NGC3810, NGC3371, NGC3193, NGC3507, NGC3593, NGC3626, NGC3190, NGC3338, NGC3646, NGC3705, NGC3681, NGC2964, NGC3239, NGC3596, NGC3686, NGC3301, NGC3226, NGC3684, NGC3900, NGC2911, NGC3041, NGC3367, NGC3162, NGC3370, NGC3433, NGC2968, NGC3346, NGC3872, NGC3632, NGC3485, NGC3495, NGC3968, NGC3389, NGC3020, NGC3599, NGC3098, NGC3455, NGC3666, NGC3801, NGC4008, UGC5470, UGC6253

Open Clusters:

Globular Clusters:

Planetary Nebulae:

Bright Nebulae:

SNREM:

Dark Nebulae:

Named Stars: Regulus (Alpha), Denebola (Beta), Algieba (Gamma), Zosma (Delta),

Ras Elased Australis (Epsilon), Adhafera (Zeta), Chort (Theta)

Number of Objects in Various Observing Clubs

Messier Club: 5 object

Double Star Club: 3 objects

Herschel 400 Club: 23 objects

Globular Cluster Club: 0 objects

Open Cluster Club: 0 objects

Planetary Nebula Club: 1 object

Urban Club: 1 object

ANNUAL MEMBERSHIP DUES

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

Club Telescopes

To check out one of the club telescopes, contact **Jason Noelle**. If you keep a scope for more than a week, please check in with Jason once a week, to verify the location of the telescope and how long you plan to use it. The checkout time limit will be two weeks, but can be extended if no one else has requested use of a club scope.



Mid-states Region Convention—Jack Dunn

The following was sent out to all clubs in the mid-states region, to be printed in their newsletters:

June is rapidly approaching and we would like to remind you of the opportunity to join with your fellow amateurs in a fun couple of days sharing stories, food and Amateur Astronomy. The Prairie Astronomy Club of Lincoln will be the host for MSRAL 2010 - the annual meeting of the Mid-States Region of the Astronomical League.

Lincoln is ready to welcome you in many ways from reasonable accommodations to great speakers and a fun program. Our website at <http://www.msral2010.info> has been online for some time. You can make all your arrangements from your computer, from making reservations for a place to stay, to paying your registration and submitting a talk you would like to present. Your registration can be paid via credit card or PayPal.

We have two suggestions for accommodations. If you would like all the amenities, the Candlewood Suites within blocks of Hyde Observatory is our main location. We have secured a room rate of \$79 per night at this very nice facility which has complete kitchen facilities in your room. Their address is 4100 Pioneer Woods Drive, Lincoln, NE 68506. There are close-by bars and restaurants and a quiet atmosphere. It is especially friendly for families. Make your reservations through Candlewood and be sure and mention you are with MSRAL 2010.

If you would like to share a room and save a lot of cash, we have secured a limited number of rooms on the UNL campus in special apartments. These are not typical dorm rooms. They have their own bathrooms. And the rate is \$29 per night. Make reservations for these through the MSRAL2010.info site. These rooms are available only for the nights of June 4th and 5th. But they are a bargain.

Now to the conference - we already have two excellent guest speakers lined up and we invite you to submit a talk via the website. Tell us about your observing, your equipment and any special projects.

We will be utilizing the auditorium in the University of Nebraska State Museum (Morrill Hall) and the Ralph Mueller Planetarium. The planetarium is a full-dome

digital facility and we'll have a number of the latest shows from around the world running both Friday afternoon and Saturday which you can enjoy. Experience Black Holes, flights into space and more. There will be a large room set up for any vendors and also for your displays of equipment, astrophotography, etc. This room will be secured and not accessible by the public.

As mentioned, our speakers include founding member of the Prairie Astronomy Club Dr. Peter Schultz. Dr. Schultz is now a professor at Brown University but also heavily involved with projects through NASA's Jet Propulsion Laboratory and Ames Research Center. He has been part of the scientific team on the Deep Impact and LCROSS projects and many more. Pete's research is related to impacts, whether on Mars, the Moon or Asteroids.

Rob Landis has been an engineer with many NASA projects including the Mars Exploration Rovers, the Space Shuttle (as a flight controller at Mission Control), International Space Station (training controllers in Russia) and also involving Near Earth asteroids.

You'll eat well at MSRAL 2010. Our own Bob Kacvinsky is cooking up a great dinner of pulled pork for our "Star-Be-Que" held the evening of June 4th at Hyde Observatory. There will be continental breakfast on Saturday and Sunday mornings and our banquet will be at the Knolls Country Club (great buffet) on Saturday evening.

So, join us in Lincoln this June. We have a lot to offer from our club, but it is the contributions of amateurs from across the Mid-States Region - their camaraderie and social networking - that will make this a great MSRAL meeting.

PAC MEMBERS:

PLEASE REMEMBER TO REGISTER FOR THE MSRAL CONVENTION!

JUNE 4-5, 2010

www.MSRAL2010.info

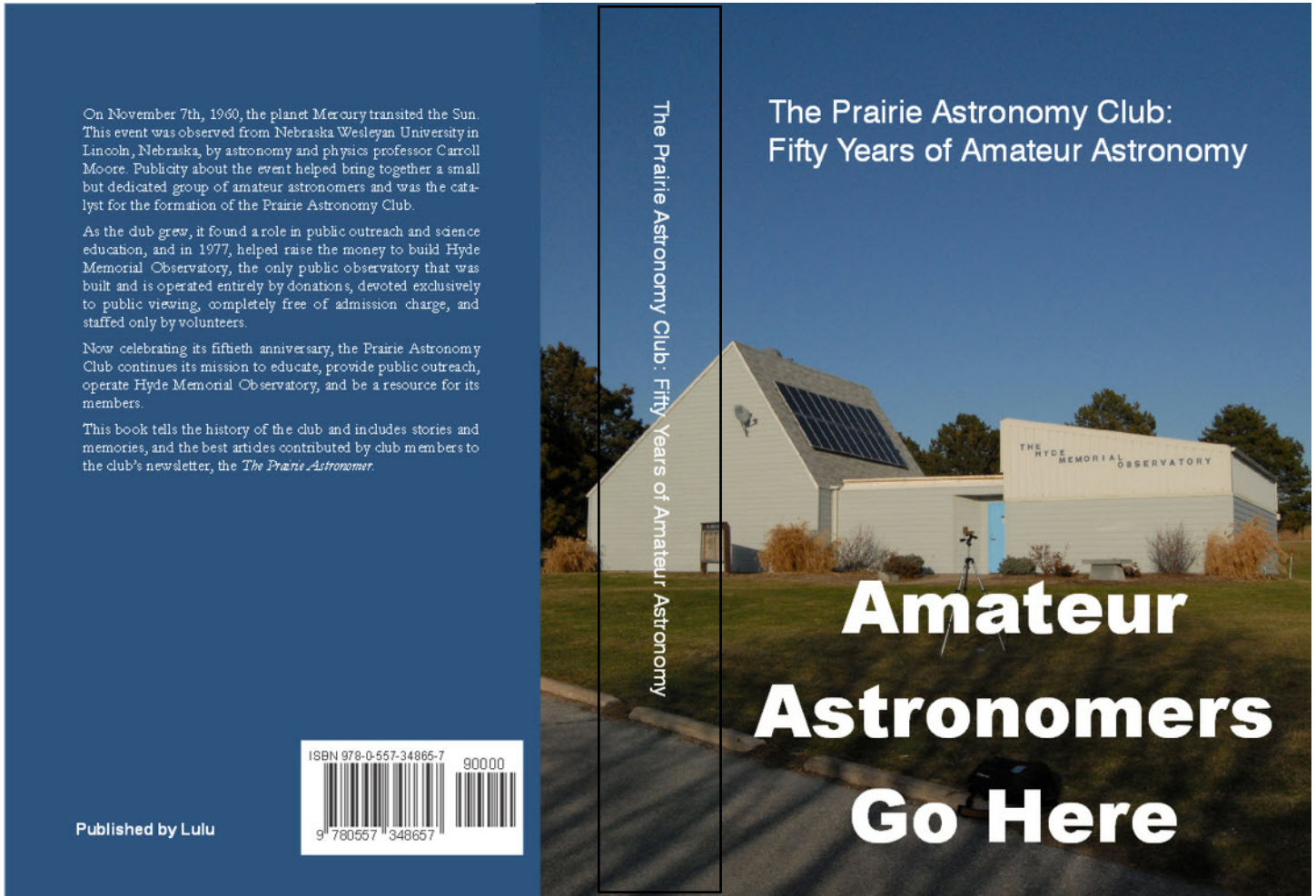
Photo Shoot for Book Cover, March 30, 7pm– Mark Dahmke

Just before the March 30th PAC meeting, at about 7pm, I'm going to shoot photos for the cover of the PAC history book, weather permitting. I'd like to include as many club members as possible, along with telescopes. Shown below is a mockup of the cover design - now I need some amateur astronomers to fill in that space in front of Hyde!

I'll send out an email reminder a few days in advance.

Also - I'll make available the JPEGs so you can download and print your own copy of the photo.

PLEASE BRING YOUR TELESCOPE!



From the Newsletter Archives, March, 1985 – Mark Dahmke

This month marks a very special time for the Prairie Astronomy Club. On March 26th we will be presenting Mr. Earl Moser with the first Prairie Astronomy Club Life Achievement Award. This award is the highest honor that our club presents to one of its members, and the deep feelings it conveys to the recipient are of the highest order. Everyone who has ever been a member of the Prairie Astronomy Club knows Earl, and therefore knows there could be no better person to receive the Life Achievement Award in its first offering. Few

members have given the PAC the support, guidance, and time that Earl has unselfishly given over the many years since the club's creation, and I doubt that anyone will ever match his accomplishment. On the evening of March 26th we will present Earl with the award and with a banquet in his honor. This is just a small outward reward for what he deserves, but with it goes a deep rooted expression of thanks that we all feel inside. Thank you Earl... –John Lortz

Focus on Outreach - Sharing Our Hobby of Astronomy –Dave Churilla

Outreach Report for April 2010

Hi everyone. I thought it would be a good idea to put something about Outreach in the Newsletter and on the PAC web site to keep you all up to date on our activities, both what we've done so far and what we are planning on doing. I'll have a schedule posted at the end of the report so you can see the upcoming events at a glance and the body of the report will tell something about each of the events. Some months it might be a bit short, but that will be your good fortune!

Winter is a pretty dead time for our Outreach activities since we depend on good weather to set up our telescopes. More is done through Hyde and although nearly everything there is done by PAC Volunteers, since it is initiated by or through Hyde we don't count it as a PAC Outreach Activity. Perhaps we should and that's likely going to be discussed in the future – but for now, it's not.

Right now we have 4 big-ticket items that are on the table, two each in the spring and autumn.

Coming up very quickly is the MSRAL Convention that PAC is hosting. If you are interested in helping with that, and we do need LOTS of help, contact Steve Lloyd (lloyds45@aol.com) as he is coordinating the volunteers for that event. And don't forget to register for the MSRAL Convention either. It's important that you don't wait to do that as we really do need head counts soon and we're counting on good representation from PAC. We have 3 National Quality speakers over the 2 days that are definitely worth the price of admission plus the banquet on Saturday night is included in your registration. And you don't want to miss Smokin' Bob K's smoked pulled pork sandwiches at the Star-B-Que on Friday night at Hyde! You can register and find out more here: <http://www.msral2010.info/>

The second this spring will be Waterfest on June 12 – well, that's technically still spring! This event is every 2 years and is a celebration of sunshine, earth and all things green as well as of Holmes Park. Two years ago we were blind-sided by numbers as we were expecting several hundred when we set up on the north side rather than by Hyde Observatory. Instead we were hit by 3,000 people and we expect the same again this year. We set up for solar observing from 5 pm to 8 pm and really need scopes with solar filters and help talking to people

and crowd control. Let me know if you are interested in helping out. I'll have my 2 (hopefully) H-Alpha set ups there.

The other two are in the fall and I don't have definite dates for them. They are Spring Creek Prairie's Twilight on the Tallgrass in September, usually around New or 1st Quarter Moon (about 400 people) and Homestead Monument's Howling Halloween near Beatrice (400-500 people). It's usually the Saturday before Halloween. I'll let you know the actual date when we get closer.

Well, that's what's up so far for the year. We're not going to hold an astronomy class this year simply because we are concentrating our efforts on the MSRAL Convention. Hope most of you will sign up to help out with some of the Outreach events as you'll really enjoy talking to the public sharing our hobby.

I've got a collection of Outreach pictures that have been taken by various club members and myself during past outreach activities. If you have some, please feel free to send them to me. I'll post one or two each report so you can enjoy them plus put them in my presentation for MSRAL.

Outreach Schedule 2010

June 4th, 5th, & 6th: Mid States Astronomical League (MSRAL) Convention Lincoln, NE

June 12th: Waterfest at Holmes Park, Lincoln, NE 5 pm to 8 pm

September: Spring Creek Prairie's Twilight on the Tallgrass 7 pm to 10 pm Spring Creek Prairie

October: Homestead Monument's Howling Halloween 7 pm to 10 pm Beatrice NE



Dale Bazan & My NexStar at Howling Halloween at Homestead National Monument October 2008



My Niece, Elise, Visited us at South Pointe Pavilion 100 Hours of Astronomy April 2009

Taking the Pulse of a Supernova—Tammy Plotner, Universe Today

Way out yonder some 40 to 50 million light years away in the constellation of Canes Venetici is a pair of interacting galaxies sometimes referred to as "The Cocoon". These two mis-shaped blobs of star stuff have already made their closest approach to each other and are now parting ways. Between them stretches a trail of stars that spans some 24,000 light years as they face each other showing off their numerous star-forming regions. But where there is life... There is death. Let's put our finger right on the pulse of a supernova.

Interacting galaxies NGC 4485 and NGC 4490 have long been of interest to astronomers as a study field for analysis of the hot interstellar medium. Like a good doctor researching every angle is Chandra – which reveals properties of the diffuse X-ray emission from these galaxies. "The high angular resolution of Chandra enables us to remove discrete sources and perform spatially resolved spectroscopy for the starburst regions and associated outflows." says Alexander Richings (et al). "This allows us to look at how the physical properties of the hot interstellar medium such as temperature, hydrogen column density and metal abundances vary throughout these galaxies."

But a good doctor doesn't stop at just one answer – they look for more – such as imaging in hydrogen alpha and with tools like SCUBA and MERLIN. And did they find more? You know it. "We detect an Ha filament emerging from the disc of NGC 4490 to a projected distance of 3 kpc which has counterparts in both the radio continuum and Hi. The HI counterpart extends to a projected distance of ? 30 kpc from NGC 4490 and we argue that

this is evidence that the giant HI envelope in this system has its origins in star formation." says M.S. Clemens and P. Alexander. "We use SCUBA and radio continuum data to attempt to place constraints on the distribution of dust with respect to the star forming regions. This analysis is limited by the lack of an independent estimate of the dust temperature, something that both 'SIRTF' and 'SOFIA' will be able to provide, however we find some evidence that most obscuring dust is not located within HII regions themselves."

Is this news? Not really. As far back as 1997 astronomers were combining images made in different wavelengths and drawing conclusions. According to the early work of Debra Elmegreen (et al); "We also present B- and I-band observations of the interacting pair in order to determine the ages of tidal star-forming regions, including a newly discovered faint tail to the east of NGC 4490. In our discussion, we distinguish this "tail" from the "bridge" connecting the two galaxies, and from the "tidal arm" that spirals out from the bright regions of NGC 4485 toward the bridge." And astronomers are about to combine images once again...

On March 4, 2008 Swift Ultraviolet/Optical Telescope (UVOT) and X-Ray Telescope (XRT) observed an event in NGC 4490, but they weren't alone. Amateur astronomer Rick Johnson captured the event as well. But one view isn't enough and the data was added to a astrophotograph taken by Dietmar Hager prior to the SN. But a good doctor doesn't stop there and yet another "data merger" occurred when combined with only weeks old RGB data taken by Torsten Grossmann.

What happens next is nothing short of magic. Watch this animated gif and put your finger right on the pulse of a supernova....

Supernova 2008ax in NGC 4490 was quite an event. The neophyte supernova was discovered independently by both the Lick Observatory Supernova Search and by astronomer Koichi Itagaki of Japan. At its beginning pulse it was believed to have been a blue variable – but the spectrum doesn't lie. Soon enough the phenomena went to a young type II supernova and escalated into a type Ib. Although the pulse might have been faint – dangling between magnitude 13 and 16 – it was there and undeniable.

Does a galaxy like NGC 4490 hold more future surprises for us? You bet. And it's not just a supernova event that sets it apart. "The nearby Sd galaxy NGC 4490 is remarkable in that it hosts one of the most numerous ULX populations within 10 Mpc, only bettered by M51 and M82. Here, we examine the X-ray spectral and temporal variability of these sources over the course of four Chandra and XMM Newton observations spanning the years 2000-2004. We detect all 5 previously identified ULXs in NGC 4490 and that in the tidal tail of NGC

4485. We also find one new transient ULX in the system. The spectral variability is generally characterized by a hardening of the source spectra as their luminosities increase. The sources show a variety of long-term light curves; however, short-term (intraobservational) temporal variability is conspicuous by its absence." says Jeanette Gladstone and Tim Roberts. "Ultraluminous X-ray Sources (ULXs) are point like, non-nuclear X-ray sources situated outside the nucleus of their host galaxy, that have X-ray luminosities in excess of 10^{39} erg s⁻¹. Various studies have been carried out on these sources since their discovery ~25 years ago, but their true nature remains uncertain."

Go on. Take its pulse. I dare you...

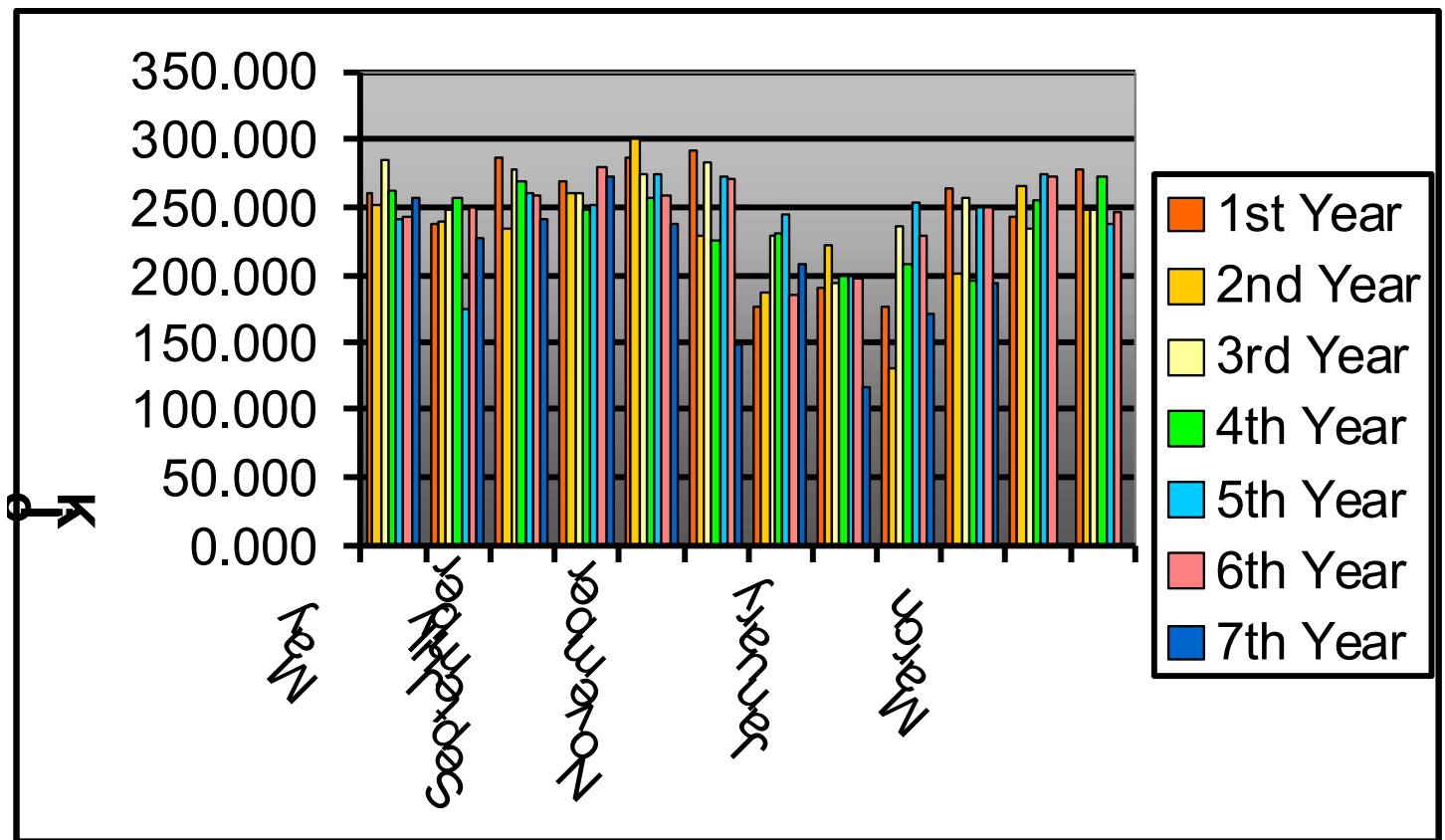
Once again, many thanks to (in alphabetical order) Torsten Grossmann, Dietmar Hager and Rick Johnson for this spectacular twist on astro-imaging!



NGC 4490/4485 – T. Grossman, D. Hager and R. Johnson

This story was originally published on Universe Today. Reprinted with permission.
<http://www.universetoday.com/2010/03/07/taking-the-pulse-of-a-supernova-ngc-4490/>

Hyde Observatory PV Energy Results, 2003-2010–Erik Hubl



To date the system has produced 20,551 kWh or: enough energy to light 205,510 100-watt light bulbs
It has supplied 40% of the energy needed to operate Hyde Observatory.

Discovery and Crew Prepare for STS-131 Mission

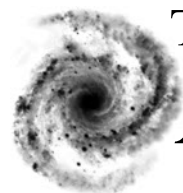
Commander Alan Poindexter is set to lead the STS-131 mission to the International Space Station aboard space shuttle Discovery. Joining Poindexter will be Pilot Jim Dutton and Mission Specialists Rick Mastracchio, Clay Anderson, Dorothy Metcalf-Lindenburger, Stephanie Wilson and Naoko Yamazaki of the Japan Aerospace Exploration Agency.

Discovery will carry a multi-purpose logistics module filled with science racks for the laboratories aboard the station. The mission has three planned spacewalks, with work to include replacing an ammonia tank assembly, retrieving a Japanese experiment from the station's exterior, and switching out a rate gyro assembly on the S0 segment of the station's truss structure.

STS-131 will be the 33rd shuttle mission to the station.



Image above: Seated are Commander Alan Poindexter (right) and Pilot James P. Dutton Jr. From the left (standing) are Mission Specialists Rick Mastracchio, Stephanie Wilson, Dorothy Metcalf-Lindenburger, Naoko Yamazaki and Clayton Anderson. Image credit: NASA



THE *Prairie* *Astronomy* *Club*

Amateur Astronomy --
A Hobby as Big as the Universe

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular \$30/yr, Family \$35/yr.** Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585.** For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Mark Dahmke, PO Box 80266, Lincoln, NE 68501 or mark@dahmke.com,** no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

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FIRST CLASS MAIL

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Next PAC Meeting
TUESDAY
March 30, 2010
7:30 PM
Hyde Observatory