

The Bulletin – The monthly publication of the Indiana Astronomical Society

August, 2007  
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[www.iasindy.org](http://www.iasindy.org)

# The Bulletin



## **The August General Meeting, August 11, 2007 7:00 PM Link Observatory Auditorium Test of Newton's Second Law for Small Accelerations Brian Woodahl**

**Abstract:** We have tested the proportionality of force and acceleration in Newton's second law,  $F=ma$ , in the limit of small forces and accelerations. Our tests reach well below the acceleration scales relevant to understanding several current astrophysical puzzles such as the flatness of galactic rotation curves, the Pioneer anomaly, and the Hubble acceleration.

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### **CURRENT RESEARCH AREAS**

Laboratory tests of violations of Newton's second law for masses undergoing small accelerations. Modified Newtonian Mechanics (MOND) applied to laboratory systems. Closed-timelike-curves, and causality violations of Einstein's field equations. Computational mathematics using Mathematica.

### **PREVIOUS RESEARCH**

Quantum field theory: higher-order self-energy of neutron star arising from neutrino exchange, Fermi's golden rule for decay processes near threshold, neutrino masses, many-body theory, time-dependent perturbation theory, finite temperature field theory for chiral interactions, non-perturbative vacuum energy of weak field, higher-order Feynman diagrams, vacuum polarization of weak field, neutrino-exchange forces. Condensed matter physics: energy of neutrino condensate, chiral potentials and neutrino trapping.

Major Professor Clayton Crowe.

### **EDUCATION**

Doctor of Philosophy in Theoretical Physics, May 1999, Purdue University,

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West Lafayette, Indiana.

Master of Science in Mechanical Engineering, August 1993, Washington State University, Pullman, Washington.

Bachelor of Science in Electrical Engineering, May 1987, Washington State University, Pullman, Washington.

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## **Mark Your Calendars!!! October 13 It is Party Time!!!**

Mark a place in your calendars for October 13. We have two special treats:

Mike Kirsch has agreed to fire up the ole grill and we will have our annual hog roast at the Link. The Society furnishes the meat and drinks and the members are asked to bring a side dish. Always a great event.

But that is not all! Caty Pilachowski has invited the IAS to come to Kirkwood Observatory in Bloomington for a tour of the Kirkwood see and maybe view through the 12" refractor built by Warner & Swasey and, as a special treat, the Remote Observing Center. We may be able to connect to one of the observers at Kitt Peak by video. This is an event you can't miss!!!

The Pres

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## **Indiana Family Star Party – We Still Need Helpers**

The Indiana Family Star Party will be held August 9-12 at Prairie Grass Observatory and Camp Cullom. Hopefully everyone has registered and we will see you there. There is still time to register if you have not. Go to <http://jmmahony.home.insightbb.com/pgo/starparty/> for further information or ask other members. If you are new and have wondered what we are talking about when we discuss star parties, this is your opportunity to enjoy one and be close to home. You can camp for the weekend or you can come each day. There is observing (hopefully), comradery, food, good talks and just plain fun. The IAS is a sponsor of this party and we are responsible for checking registrations at the gate. Gerald Venne still needs help. Give him a call if you can spend a couple of hours with him.

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## **Astronomical League**

**A/L Update:** Several of the people who joined the Astronomical League have been curious when packets and other “stuff” will be coming. We are in the process of determining what kind of a member's packet we are to get from the Astronomical League. A/L has gone electronic and most of their information is available to members on line at <http://www.astroleague.org/observing.html>. We will need to determine how to handle those who do not have computers. Each person who joins gets a copy of the *Reflector* quarterly. We will find out what else comes with the membership and let you know ASAP.

### **ALCor Observations**

by Bill Conner

As the Astronomical League Correspondent (ALCor) it is my responsibility to advise the membership about AL programs and benefits. Each month this column will feature an AL observing club award, or other item of interest to Society members.

This month's column is about the Binocular Messier Club

To qualify for the AL's Binocular Messier Certificate and pin, you need only choose and observe 50 Messier objects using only binoculars. Any pair of binoculars may be used, but those with objectives between 20mm and 80mm in diameter are recommended. I was able to do mine with 9 x 35mm binoculars from a dark sky site. To record your observations, you may use an AL logsheet or create your own. The log should include: object, date, time, power, seeing, type of binocular, and observing notes. The observing notes should include information on how you located the object and a detailed description of the object. For more information and downloadable copies of very helpful Messier observing aids, log into the AL Observing Programs website at: <http://www.astroleague.org/observing.html> and page down to the Binocular Messier Club link.

#### HINTS:

A detailed star chart or planetarium program on a laptop is a must for describing your star-hopping to the object observed. Know your binocular's field-of-view. This is usually stamped on the binocular along with the power and objective diameter: For example, 4 degrees, 7 x 50. Many list the field of view in feet at 1000 yards. In this case you will have to pick two stars that are at opposite sides of your field of view and look up the separation on your star chart. List this information under "Type of Binocular" in your log. Pick the brightest Messier objects to make locating them relatively easy.

Always start with a reference star that you can see with your naked eye. For example, here is a description for M57, the Ring Nebula: "From the star Vega in the constellation Lyra, I sweep South South East (SSE) one field of view and see a fuzzy smudge roughly half-way between Beta Lyrae and Gamma Lyrae. This smudge is identified as M57 on my star chart." Remember that the AL Awards reviewer must be able to recreate your observation in order verify that you actually located the object.

Doing this in a group at a star party or in your back yard with friends can be a lot of fun.

For more information and downloadable copies of very helpful Messier observing aids, log into the AL Observing Programs website at: <http://www.astroleague.org/observing.html>

Thanks!

Bill Conner ALcor

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### **JEPC Event (Wolford/Mitchell Star Party)**

Our JEPC Event has come and gone. Danny and I would have been satisfied if perhaps a half dozen or so folks would have come. But we had 24 people show up! TWENTY FOUR PEOPLE SHOWED UP --- and we all had a good time. Several even asked if we were going to do this again next year --- mmmmmm...

As the date for the event was closing in, I was receiving e-mails saying "I think that I'm going to Nebraska." Or "It's too far and will cost too much." Or "I've got too many other things to do." I began wondering if anybody would show up --- "this is NOT going to be

good”, I thought. THANK YOU everybody for coming and proving me wrong! Danny and I (and Mitch) learned one positive thing. Create a date at a dark sky site and people will come! One family mentioned a five hour drive. Several of us drove for four to four and a half hours to get there. Was it worth it --- YUP!!!

Danny and Debbie were setting up when I arrived early Thursday afternoon. We discussed what we expected and pretty much decided on the “wait and see what happens” approach. The afternoon was warm with a chance of afternoon and evening thunderstorms. The weatherman was correct --- we had dark skies alright, but not the kind that are acceptable for observing! Ten of us kept a close eye on the clouds, but Thursday night came and went. With Friday morning came the sunshine. It was a typical Midwest summer day, and along with the sunshine (and the great forecast for the evening) the observers kept coming! A total of 24 people came to enjoy the dark skies and camaraderie. Heck, even Barabbas had someone to visit with!



Most of you know that my personal telescope is a 15” dobsonian. Excepting for a couple of 12.5” scopes on the field, my scope was one of the smaller scopes. There was a 20” Obsession, a 22” Tele-kit, Danny’s 24” Starmaster, and a 30” Obsession. What a treat to get to view through such a variety of manufacturers and sizes. (If you ever want to REALLY see the Veil Nebula --- just pull up a 30” scope and start drooling. Yes, perhaps it really IS God’s shower curtain!)

Friday night was perfect. Most of us did get to see the central star in the ring (M-57) through Danny’s 24” scope. Then as mentioned above, we all got to see the Veil Nebula through Rick Rashman’s 30” --- a view that will not be easily forgotten!! Sandy worked on her ARP Galaxy list and managed to spot several of those faint fuzzies.

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Major kudos go to Mitch Lumen who completed the Herschel II list. For those who may not know --- the Herschel list is 400 objects that are quite difficult to observe. Very few people achieve the entire list. HOWEVER, the Herschel II list is a SECOND list of 400 objects that are even more obscure than the first list of 400. Congratulations Mitch!

On Saturday afternoon, Debbie counted the money --- we were way over our costs --- by \$50.00!! We decided to raffle it off --- I scribbled everybody's name on scraps of paper. We were giving five \$10.00 prizes away, and she even picked herself for one of them!

The winners were:

Sandi Pockalny

Ray Pockalny (I think he had the drawing rigged!)

John Switzer (I KNOW that he probably had it rigged!)

Chris Lawrence

Christy Thompson

And finally, the photo that all of you have been waiting for --- the group picture!



Left to right: Danny Mitchell, Vicki Switzer, John Switzer, Christy Thompson, Bev Thompson, Paul Thompson, Donna Emmons, Mike Wolford, Sandy Wolford, Mitch Lumen, Eldonna McCarty, Bill McCarty, John Wasmuth, Rick Branson, Chris Lawrence, and of course Barabbas.  
Thank you to Debbie Mitchell for sacrificing the honor of being in the picture by being the chief photographer!

Those who skipped out before our photo opportunity were: Rick Rashman, Chris and Angela Dietz, and Mike Robertson.

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From both Danny and I --- thank you all for coming! Perhaps we'll do it all over again next year!!

Hopefully everybody will come to JEPC again in September for the Illinois Dark Skies Star Party.

Mike Wolford

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### **New Moon Observing and Public Event at McCloud August 17**

Our next New Moon event is at McCloud on August 17. We had a great event in July with 7 members and about 70 McCloud visitors. This is also a public event so we need to have scopes available for them to look through. Careful about parking we do not want to tear up the grass. Come out and enjoy the Indiana night skies.

*The Pres*

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### **Space Exhibit at the State Museum July 21 – Back to the Moon Event**

We had our final exhibit at the Museum. Again we had a good turn out of people. The booth worked well and we had lots of visitors. Thad Hatchett and I set up outside on the canal and did some solar observing. We had lots of people. It was a gorgeous day. If you have not been back there it is really pretty with the canal, the flowers, boats and bicycles. A really nice place to take the kids and walk. The only bad thing was the Sun was as bald as a cue ball. No Sun spots nor prominences.

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### **NAG August 18 7:30 PM at Link**

The next meeting of the Indiana Astronomical Society's **New Astronomers Group** for 2006 will be held on Saturday, August 18 at Goethe Link Observatory starting at 7:30 pm. Weather permitting there will be an observing session using IAS member's telescopes and binoculars following the meeting.

**THE NAG MEETING WILL BE HELD - RAIN OR SHINE.**

Topics for this month:

- Observing the Late August/Early September evening sky
  - Reading a Star Chart
  - The Summer Pointer Stars
  - The Summer Triangle
  - The Great Square of Pegasus
  - Our Solar System
  - The Deep Sky
    - Our Own Milky Way
    - M2 – Globular Cluster in Aquarius
    - M34 – Open Cluster in Perseus
    - M39 – Open Cluster in Cygnus
    - NGC7662 – The Blue Snowball Nebula

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- Autumn's Finest Double Stars
- A Beginners Introduction to the Telescope
- Question and answer session

The purpose and intent of the NAG is to introduce new astronomers to observing the night sky. All types of observing will be discussed including naked eye, binocular and telescope.

If the weather cooperates, following the meeting, IAS members will have telescopes set up and attendees will have an opportunity to view some of the night sky objects discussed during the meeting.

Sept 22

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### **Mirror Coating – An Examination of the Techniques**

This is a discussion on mirror coating by James Mulherin who is President/Lead Optician of Optical Mechanics, Inc.(OMI Mirrors). I thought it was very interesting and wanted to share it with the group. It was part of a discussion on the Obsession chat group.

"I have a little more info to add to this discussion. I've been studying coating processes for a while now as we've been considering the purchase of a coating machine. Our machine is currently being built. We expect to take delivery the first week of August. Here's a quick primer based on what I've learned.

First, a quick review of the basics for those not familiar with the coating process. The three materials used in astronomical coatings are aluminum, silicon dioxide and titanium dioxide. A standard coating consists of just enough aluminum to achieve the maximum reflection that the material can provide. As the aluminum is applied the reflectivity increases to a maximum of ~88% in the visible for bare aluminum. A standard protected aluminum coating includes one layer of SiO<sub>2</sub> on top of the aluminum. The basic protective SiO<sub>2</sub> overcoat is only thick enough to "seal" the aluminum from the elements and provide hard, scratch resistant layer. It's not intended to enhance the reflectivity.

If you can control the thickness of the SiO<sub>2</sub> layer, you can enhance the reflectivity by applying 1/4-wave thickness of the wavelength you are most interested in. This is referred to as one QWOT (quarter wave optical thickness) of SiO<sub>2</sub>. In our case that would be 1/4-wave of 5500 Angstroms or 1375 Angstroms of SiO<sub>2</sub>. By applying the proper thickness, the reflectivity can be enhanced to about 91% at 5500 Angstroms. The region of 91% reflectivity is fairly narrow. In other words, as you move away from 5500 Angstroms on the spectrum the reflectivity drops. Many coating labs refer to this single 1/4-wave layer as Semi-enhanced Aluminum.

If you take the semi-enhanced aluminum coating and add a QWOT of TiO<sub>2</sub>, you can enhance the reflectivity to about 96% in the visible. Now you have one High index/Low index stack or HL stack. Most labs refer to this coating as Enhanced Aluminum. To continue to increase the reflectivity you add additional HL stacks. You can increase the reflectivity to about 98% with two HL stacks, in other words, Al, SiO<sub>2</sub>, TiO<sub>2</sub>, SiO<sub>2</sub>, TiO<sub>2</sub>. These are typically branded as proprietary enhanced aluminum coatings.

All of the above are subject to fiddling and fine tuning depending on several factors; evaporation method, process temperature, ion assist and the addition of process gas. This is where it gets

complicated. I'll start with the most basic process.

### **Thermal Evaporation**

Thermal evaporation of aluminum is accomplished by wrapping aluminum around a tungsten coil. Current is applied to the coil to melt the Al (wet the coil) then the current is increased to evaporate the aluminum. This is fairly straight forward. Next the SiO<sub>2</sub> is evaporated but this is more of a challenge. SiO<sub>2</sub> does not melt and evaporate from the liquid state. It sublimates. In other words it goes straight from solid to vapor. In addition, the plume of evaporant coming off the source is not regular. This makes it difficult to control the rate of deposition and the uniformity of the deposit on the glass. To combat this problem SiO<sub>2</sub> is evaporated from a container with internal baffles and an opening in the top from which the evaporant escapes. This provides a more uniform plume and allows for a uniform coating. TiO<sub>2</sub> is evaporated from a crucible that is heated by a tungsten coil.

During the evaporation process some disassociation occurs. Some of the SiO<sub>2</sub> breaks down to become SiO and just Si. What is deposited on the glass is a mixture of these elements. Similarly for the TiO<sub>2</sub>. This changes the refractive index of the layers as they are deposited on the glass. What you get is not necessarily what theory predicts. If you measure the refractive index of your deposits with an ellipsometer, you can adjust your coating design according to your actual indices.

Other factors that affect the refractive index of the coating layers are substrate temperature and coating layer structure. As the material condenses on the mirror it has to maintain some of its energy so that it can settle into the material matrix. If the substrate is cold the condensate accumulates like frost. What you're after is something more like freezing rain. Hence, the substrate needs to be heated to a certain temperature specific to each material as each material is deposited. You want the coating layers to be amorphous and dense. Such a coating has a more predictable and repeatable refractive index and it is moisture stable. A porous, frost-like coating absorbs moisture which changes the refractive index of the coating and results in premature deterioration of all of the layers, including the aluminum. This type of coating should not pass QC.

### **E-beam Evaporation**

In an E-beam system the material is evaporated by sweeping a high energy electron beam across the material. Modern e-beam systems allow for control of beam energy, focus, sweep pattern and sweep speed. They provide so much control that they can generate a uniform evaporant plume, even when evaporating SiO<sub>2</sub>. The typical e-beam system has several indexable pockets. This allows the system to apply all of the different materials in as many layers as you like.

When integrated with a deposition rate monitoring system, such as an oscillating crystal monitor, the e-beam can be set to deliver very specific deposition rates and thickness for each material in the coating design.

### **Ion Assist**

Ion assist provides several benefits to the coating process. The ion source provides a plume of high energy inert particles (ionized argon gas) that impinge upon the coating materials as they are deposited on the glass. They literally hammer the coating molecules into place to provide a more dense, moisture stable matrix. Some added benefits are; the process is effective at lower



substrate temperatures thus allowing more gentle heating of the mirror.

### **Process Gas**

As mentioned, some disassociation of the SiO<sub>2</sub> and TiO<sub>2</sub> occurs during the evaporation process. This happens regardless of the evaporation method used. This is where a slight partial pressure of process gas comes in. In this case, oxygen is injected into the process. The background of oxygen gas helps to keep the SiO<sub>2</sub> and TiO<sub>2</sub> at stable equilibrium during the deposition process.

### **Coating Uniformity**

Coating uniformity is achieved by rotating the mirror above the evaporant source or rotating three or four mirrors in a planetary holder system. A single rotating mirror will typically require what's called uniformity mask. The mask blocks some of the evaporant such that the mirror receives a uniform thickness of coating from center to edge. Finding the right shape for the mask is non-trivial and requires several trial runs for each evaporant material. With care however, thickness uniformity of a few percent can be achieved over a large mirror. The better alternative is a planetary rotation system where the mirror rotates around its axis as well as around the center of the chamber. Uniformity as low as 1% can be achieved with a planetary rotation system.

Will an enhanced coating change a mirrors figure?

With regard to the coating changing the figure of the mirror, consider the application of each layer of material. The layer most likely to change the mirrors figure is the aluminum layer as it forms the surface from which the light is reflected. The SiO<sub>2</sub> and TiO<sub>2</sub> layers are transparent. They act only to enhance the reflectivity. If they lack uniformity their primary effect will be a variation in the reflectivity across the mirror.

The aluminum layer is about 900 Angstroms or approximately 1/6-wave thick at 5500 Angstroms. A loose tolerance on coating uniformity is 5%. This is equivalent to 1/122-wave at 5500 Angstroms. A more realistic target for uniformity is 2% or 1/300-wave. A properly applied coating will not change the figure of the mirror by any significant amount. It would have to be a very poor job in deed to ruin a mirrors figure.

### **Summary**

There are many details that go into producing a high quality coating. I haven't even listed all of them here. There are many other factors on the input side of the coating equation. The trick is to have a way of measuring the out put and an understanding of which inputs to adjust to achieve your process goals. At the same time you need good process monitoring and real time control of the process. Modern coating machines typically include e-beam evaporation, ion assist with process gas and deposition rate monitors with all of the machines functions controlled by a computer connected a programmable logic controller (PLC) for each of the systems on the coating machine. The machines are complex, fully automated and self monitoring and they can reliably and repeatably run a well designed and de-bugged process to produce a desired result. Much of this technology was developed by the semi-conductor industry where coating designs can include hundreds of layers with very tight tolerances. The coatings we use on telescope mirrors are exceedingly simple compared to the capability of modern coating machines.”

*The Pres*

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## **IU Astro e- Bulletin**

The IU Astronomy Department has started a new electronic bulletin to let people know about local astronomy activities and events. If you would like to subscribe, send an email to [astdept@indiana.edu](mailto:astdept@indiana.edu) and we'll put you on the distribution list. Information about activities and events to be included in the e-bulletin should be sent to [catyp@astro.indiana.edu](mailto:catyp@astro.indiana.edu).

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## **The Kirkwood Observatory**

IU's Kirkwood Observatory Open for 2007

IU's historic Kirkwood Observatory has reopened for the 2007 season. The Observatory houses a 12" refractor built by Warner & Swasey in 1901. The f/15 doublet objective lens, designed for work on visual binaries, was made by John Brashear and produces excellent images when the seeing is good. The Observatory was renovated in 2001 and restored to its original condition, including a massive wooden dome. William Kopp, a machinist in the IU Astronomy Department, refurbished the telescope itself. More information about the Observatory is available on the Web at [http://www.astro.indiana.edu/kirk\\_sch.shtml](http://www.astro.indiana.edu/kirk_sch.shtml).

The Observatory is open each clear Wednesday night from now through mid-November. The hours are posted on the Web at [http://www.astro.indiana.edu/kirk\\_sch.shtml](http://www.astro.indiana.edu/kirk_sch.shtml), and a new "hotline" is available with current information about weather conditions. Call 812 855-7736 to find out if the Observatory will be open before driving to Bloomington.

The Observatory is located in Dunn's Woods, near the southwest corner of the IU campus in Bloomington. A campus map is available on the web at <http://www.iub.edu/~iubmap/>. Parking is available after 5 PM in the IU lot at the southwest corner of Indiana Ave. and 4th Street.

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## **Gadgets and Gizmos**

This is a new section to discuss new equipment. If you see something or have a new gadget let me know and we will get an article about it.

None this month

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## **Meet Our New Members**

Seek out new members out and see if you can help them out.

The Society wants to welcome each of you and if you have any questions do not hesitate to ask.

Bob Baar Greenwood

Dawn Wafford Indianapolis

Richard Wells Indianapolis

Greg Hazard Greenwood

Paul Morow Carmel

Stephen Brown Indianapolis

Carlos Morales Indianapolis, IN

*The Pres*

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## Mentor Program

We are reinstating the mentor program which will provide the new member with lots of information and help them assimilate into the Society. Thad Hatchett has volunteered to lead this program. We need your help. If you are interested in becoming a mentor please contact me at Jeff Patterson [KB9SRB@hotmail.com](mailto:KB9SRB@hotmail.com) or Thad Hatchett at [astronomynut@sbcglobal.net](mailto:astronomynut@sbcglobal.net). We will put your name on the list and assign a new person to you. Our goal is to retain people and make this hobby a lot more fun.

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## Upcoming Star Parties and Registrations

**Indiana Family Star Party** Camp Cullum, Frankfort, IN Aug 10-12  
<http://jmmahony.home.insightbb.com/pgo/starparty/>

**Black Forest Star Party** PA Sep 14-16  
<http://www.bfsp.org/starparty/>

**Astrofest** Vana Farms, Kankakee, IL. September 6-9  
<http://www.chicagoastro.org/>

**Prairie Skies Star Party** – Kankakee IL – September 13-16, 2007  
<http://www.prairieskies.org/>

**Illinois Dark Skies** Jim Edgar Panther Creek State Park, IL. September 13-16  
<http://www.sas-sky.org/>

**Twin Lakes Star Party** Pennyville State Park, Western KY Oct 6-13, 2007  
<http://www.wkaa.net/>

**Okie-Tex Star Party** Camp Billy Joe, OK Oct 6-14  
This is supposed to be one of the darkest sites in the US. <http://www.okie-tex.com/>

**Eldorado Star Party** – Eldorado, Tx (South Central) -October 10-13, 2007

If you know of events coming up let me know and I will get them in the Bulletin

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## Public Outreach Programs

Gerald Venne is our Public Events Chairman. He will be responsible for coordinating Public Events for the IAS. He needs your help. Let Gerald know if you would like to show the public our sky.

We need people to help at Link and elsewhere. It is actually a lot of fun.

To schedule a public event contact Gerald Venne 1 317 826-2680 or Jeff Patterson at 1-317 882-8055.

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## Astro Ads

Are you changing or upgrading your equipment? Do you have or are you looking for astronomical materials and equipment? The Indiana Astronomical Society as a service to its members, will publish non-commercial ads at no charge. The ad will stay in the Bulletin for 4 months and may be renewed at the owner's request.

### To place an ad contact:

Bulletin Editor

Jeff Patterson

1780 S. Morgantown Rd.

Greenwood, IN 46143

(317) 882-8055

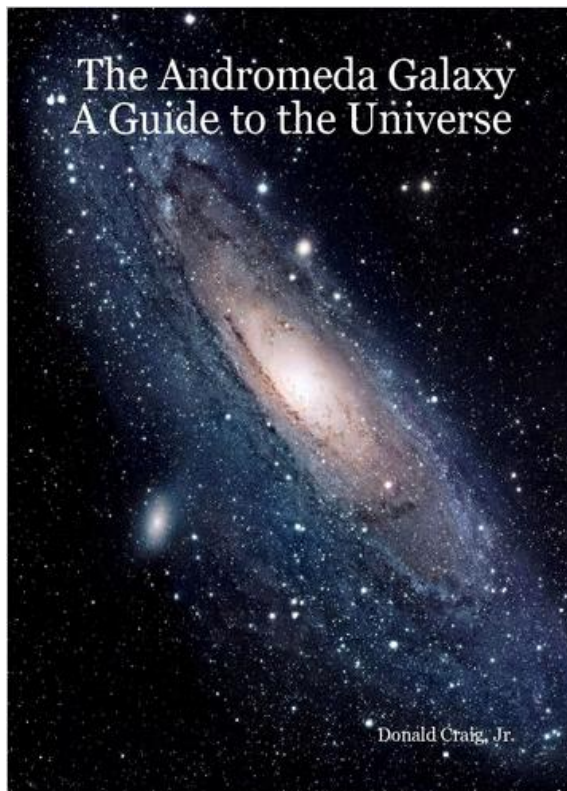
E-Mail: [KB9SRB@Hotmail.com](mailto:KB9SRB@Hotmail.com)

### For Sale

Digital SLR and Film astrophotographers take note. Vixen R200SS-DG Astrograph for sale. Coma Corrector, Rings, 7 x 50 Finder, custom made Just-Cheney Dew Shield, 2" eyepiece adapter, Direct Wide Field adapter and f/7.5 telextender included. Film images of the Rosette and North American nebula, CCD images of the Helix and Eastern Veil on the IAS photo web site under Bill Conner were taken with this 8 inch f/4 widefield scope. Asking \$1,200 for over \$1,700 of quality equipment listed here.

Contact Bill at 812-828-0499 for more information

### For Sale



A small mist of light, known for centuries, has opened up our Universe.

At last, here is the complete story of the Andromeda Galaxy, written for the amateur astronomer, by an amateur astronomer.

Read about the early history as well as the latest research findings from observatories and universities around the world, written and assembled in a two-year effort by Donald Craig, Jr. in Indianapolis, Indiana.

You will see stunning astrophotographs covering the entire electromagnetic spectrum from the HST, GALEX, SPITZER, CHANDRA, RadioGBT, XMM-NEWTON, and beautiful color photographs from many well-known astrophotographers.

The book has ninety-six, 8 ½ “ X 11” pages written in a natural, informative style with guidance for the amateur astronomer.

It's available in both paperback (\$25.99) and hardback (\$36.41) editions at:  
<http://stores.lulu.com/andromeda>

### **For Sale – Astro-Physics 400 German Equatorial Mount**

Near new condition. Used less than a dozen times.

9 lb. Stainless Steel Counterweight  
6 lb. Stainless Steel Counterweight  
Wooden AP case  
Encoders  
NGC-MAX DSC Computer

\$1995

Contact: Jim Rinehart 317-881-3475 or jrine33@comcast.net

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### **Onions and Orchids**

We need to thank Gerald Venne and all the volunteers who helped provide the exhibits at the State Museum. You guys did a great job! All who worked need a pat on the back. And we had fun too.

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### **The Loaner Program**

The Loaner Program has been helpful to those new to the hobby and others in need of observing equipment. We consider offers of equipment you may not have need for any longer.

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Did you know you can borrow a scope or piece of astronomy equipment from the Society and take it for a test drive? The Society has a program where members who are trying to determine what kind of equipment to buy can borrow one of the Society's scopes for a month or two and see how they like it. John Molt is the chairman of the program and can arrange for your pickup and training on the use of the particular instrument. This is a great way to see what telescope you want to purchase. We have several scopes, eyepieces and binoculars to loan.

John Molt ([1stargazer@indy.rr.com](mailto:1stargazer@indy.rr.com)) or (317) 989-1875

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### **List Server Online - Don't be left in the cold - Sign up!**

This service is our main communication tool. The list server is in the "Members Only" section of the site and is accessible only by IAS members. Make sure we have your correct e-mail and you will have access for late updates to events and functions.

Note: The list server is for use of Society business. It can only be used according to the rules as outlined previously. Members abusing the service will be eliminated from the service.

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### **Board Meeting – August 16, 2007 - 7:00 PM**

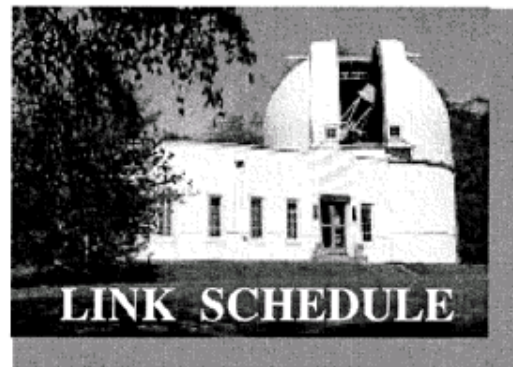
The IAS Board Meeting is being held at 430 Massachusetts Avenue in downtown Indianapolis. The building is at the point of convergence of Mass. Ave., Vermont and Alabama Streets. There is a Starbucks located in the frontage of the building. The coffee shop stays open late into the evening. Try to park as close to Starbucks as possible, preferably in a metered space. On-street parking is free after 5pm. Handicapped parking is directly in front of Starbucks entrance. The main entrance to the building is to the right of Starbucks, but it will be locked. To get into the building, walk around the building to the left as you are facing Starbucks. You will cross Starbucks outdoor patio seating area and you will come to the double door entry into the building (this is the south building façade). These doors will be unlocked. Enter the lobby and ride the elevator (to your right) to the basement. Turn right as you exit the elevator and go through the first door on your right. This is the conference/meeting room. If you need further assistance, please contact Brian P. Murphy, IAS Vice-President on his cell phone 716-8124.

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### **Goethe Link Observatory Observatory Address**

**Goethe Link Observatory  
8403 N. Observatory Lane  
Martinsville, IN 46151**

**Observatory's Phone:  
(317) 831-0668**



This schedule is being published to assure proper access to the Link Observatory for programs that are designed as observational, general education, astronomy conferences or amateur research projects. Training programs are tentatively scheduled for Saturday evenings only. Although other requests can over-ride these sessions. It is the purpose of this listing to prevent activity conflicts.

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If you need to acquire use of the 36-inch telescope: remember two important IAS guidelines:  
1) *There has to be two or more IAS members present.....* 2) *contact the Observatory Manager: Gary Schoppenhorst (317)297-1405. DON'T WAIT UNTIL THE LAST MINUTE TO MAKE YOUR REQUEST OR YOU MAY NOT GET ACCESS.*

### **Link Activities for August:**

August 11 General Meeting  
August 11 New Moon at Link  
August 18 NAG – 7:30PM  
August 18 General Observing at Link

### **McCloud Activities for August:**

August 17 New Moon and public observing event

### **Observing Activities**

We are able to go to the Link, Prairie Grass Observatories and McCloud Nature Park at non scheduled times if they do not conflict with reserved activities:

For those interested in going to The Link Observatories for observing call Gary Schoppenhorst 1 317 297-1405.

For those interested in going to Prairie Grass Observatories for observing call Hoppe at 1-765-296-2753.

For those interested in going to McCloud to observe, please call the park caretaker, Jim Holtsclaw, at the park office 765 676 5490 before 4PM on the day you want to go out. He will give you permission to be there at night and cut off the lights.

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## **Bulletin Stats**

### **Accessing the Bulletin**

The current bulletin can be found on the website [www.iasindy.org](http://www.iasindy.org)

### **Bulletin - Bulletin deadline on the 20th of every month**

The monthly newsletter welcomes articles of local astronomical interest information and want ads:

Please submit to  
The Indiana Astronomical Society, Inc  
Jeff Patterson, editor  
1780 S. Morgantown Rd  
Greenwood, IN 46143  
Phone: (317) 882-8055  
[KB9SRB@hotmail.com](mailto:KB9SRB@hotmail.com)

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### **Membership information**

Contact any IAS officer or the Treasurer  
John Shepherd (317) 862-3442

### **Link Observatory**

Latitude: 39 degrees, 33 minutes North  
Longitude: 86 degrees, 24 minutes West  
Phone: (317) 831-0668  
IAS Internet address  
<http://www.iasindy.org>

### **Executive Officers**

President: Jeff Patterson (317) 882-8055  
Vice-President and Program Director: Brian Murphy (317) 841-8511  
Secretary: Betsy Brown 1-317-872-4050  
Treasurer: John Shepherd (317) 862-3442

### **Board of Directors**

Gary Schoppenhorst (2009)	Bill Conner (2007)
Gerald Venne (2009)	Marion Hakes (2008)
Thad Hatchett (2007)	John Molt (2008)
Doug Brown (2007)	

### **Public Event Chairman**

Gerald Venne [gvenne@iquest.net](mailto:gvenne@iquest.net) 1 317 826-2680

### **Library Committee Chairman**

Larry Marcus [marcus@mwmacoustics.com](mailto:marcus@mwmacoustics.com) 317 842-6658



### August Calendar, 2007

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5  Last QTR Moon	6	7	8	9 IFSP	10 IFSP	11 General Meeting at Link New Moon Observing IFSP
12  New Moon	13	14	15	16 Board Meeting	17 McCloud Observing	18 NAG at Link General Observing
19	20  1 <sup>st</sup> QTR Moon	21	22	23	24	25
26	27	28  Full Moon	29	30	31	

## Membership Application to the IAS

### Benefits:

- Use of the Goethe Link Observatory
- Formal monthly programs with guest speakers
- Local and regional astronomical functions
- Discounted Astronomy publications
- New Moon observing activities
- Access to IAS member experts and problem solving
- The Bulletin monthly newsletter
- Free admission to the Holcomb planetarium
- Star party events and observing sessions

Please mark whether this is a new or renewal application

New

Renewal

Note: Magazine subscription renewals forms and payment must be submitted to the Treasurer in order to maintain publisher's club discount.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

How do you want to receive the IAS monthly newsletter?

Downloadable from Website  Hard Copy\*

\* Please note that hard copy costs the Society about \$1.50 per issue. Please consider this when selecting mode of receiving the newsletter.

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Annual Regular Membership (\$25.00)	
Annual Student Membership (\$10.00)	
Astronomy Magazine Renewal (\$34.00)	
Sky and Telescope Magazine (\$33.00) (New Subscription)	
Astronomical League*	
Total Enclosed	

\* If you want to join the Astronomical League please contact John Shepherd ((317) 862-3442) first to determine the amount of prorated dues required.

Make checks payable to: The Indiana Astronomical Society, Inc

Please complete Member Profile and include with the application

Mail Application to: John Shepherd, Treasurer

4609 Callahan St.

Indianapolis, IN 46239

Member Profile

Spouses Name: \_\_\_\_\_

Children's names and ages: \_\_\_\_\_

Education: \_\_\_\_\_

Occupation: \_\_\_\_\_

How many years associated with Astronomy? \_\_\_\_\_

Special astronomical interests or projects: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

-

Equipment: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What can the Society do for you? \_\_\_\_\_

\_\_\_\_\_

What can you do for the Society? \_\_\_\_\_

\_\_\_\_\_

Note: Profile information is not a requirement for membership to the Society. This information is entered into the IAS database and is not given nor sold for solicitation purposes. It does provide for a brief welcoming article for new members and may be used by the society to match people with similar interests.