

Event Horizon

April 2006

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Astrophotography Experiences *by Tim Harpur*

I have been approached by a few people about some of my recent astrophotos and the method(s) I use to achieve a focused image. First off, like many of you, I am just learning as I go. Second, my experience is only with digital cameras and not CCD astro-cameras.

When I first started dabbling in astrophotography last fall I was holding my 4MPix digital point&shoot camera up to the eyepiece (afocal) of my 25x100 binocs - not the best setup. It produced 'ok' pictures of the moon, but that was about it. No tracking ability... and the idea of trying any other object using this method was out of the question.

I quickly realized I wanted far more - so I rushed out and bought a fast f4 10" Schmidt Newtonian on an LXD75 goto mount. In order to mount my camera (the same P&S) I bought an EZPix universal camera mount. This allowed me to attach my camera to any eyepiece I had mounted on my new scope. I was now able to track objects and try my hand at longer exposures - I used the Orion Nebula as my test subject. At first, I was getting severe coma on stars that were not near the centre of the FOV. This had me a liittle baffled and I was constantly trying to adjust the focus to clear up the image. When this didn't seem to work I researched the problem online and discovered it had nothing to do with focusing but rather the collimation of the OTA. I ordered a laser collimator. Once it arrived, I collimated the OTA and took some more images of Orion. I was quite pleased, as the images had improved drastically and the coma had been drastically reduced.



Example of the effects of a poorly collimated scope and a properly collimated scope - still using P&S digital camera.

Focus was still difficult - especially when I couldn't make out much of the target in the 1.8" LCD view screen of my camera, and the captured image was still faint and not showing much nebulosity. At this time I made another decision - I couldn't go on using a basic P&S style camera if I wanted to take serious photos. I did a little research and decided to pick up a Canon Digital Rebel XT DSLR camera - it has an 8MPix CMOS sensor and a maximum ISO setting of 1600 - twice the resolution and four times the sensitivity of what my P&S was capable of. Being an SLR it also allowed me to remove the lens - but I was still shooting afocal as I didn't have the necessary T-Adaptor to mount the camera in prime focus.

I still wanted to go the next step and start shooting in prime focus, and my T-Adaptor arrived a few weeks later. Shooting in prime focus, with no unnecessary lenses in the path, cleaned the image up even further.



Examples of afocal and prime focus images - now using a DSLR camera.

As I was learning how to use the different equipment I was also trying different techniques in processing the images. I've settled on a combination of colour processing in a digital photo editor and stacking multiple images using Registax. I've then gone the extra step of taking different sets of images at different ISO settings and "blending" the resulting images to reduce wash out that will occur to areas that are over-exposed. Be careful not to adjust the rotation of the camera while adjusting any of the camera's settings - or you will be spending hours, as I did, rotating each of the images in a photo editor before they can be stacked.

Cont'd on page 13 ...

Meeting space for the Hamilton Amateur
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Email Reminder notice

We send email reminders before each meeting which describes the location, time and topic of the general meeting.

If you're not on the list, make sure that you receive your reminder by sending a note to:

publicity@amateurastronomy.org

An Offer

Thinking of buying your first telescope but wondering what kind to get? Before you buy, consider this offer from Mike Spicer: a "loaner" 5 inch telescope with electronic alt-az controls. The scopes are lightweight, easy to set up and very easy to use. Mike is offering newer members of our club one of these telescopes to try out for a month or so. Interested? You can reach Mike by email at deBeneEsse2001@AOL.com or by phone at (905) 388-0602.

Articles submissions

The HAA welcomes your astronomy related writings for the Event Horizon newsletter. Please send your articles, big or small, to:

editor@amateurastronomy.org

The submission deadline is two days before each general meeting.

HAMILTON AMATEUR ASTRONOMERS

Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA).

The HAA is an amateur astronomy club dedicated to the promotion and enjoyment of astronomy for people of all ages and experience levels.

The cost of the subscription is included in the \$25 individual or \$30 family membership fee for the year. Event Horizon is published a minimum of 10 times a year.

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Submissions to the web site or newsletter are welcome, and may be edited for size & content.

Chair's Report

by Glenn Muller

With an active Club like the HAA, you don't always need clear dark skies to enjoy astronomy. Aside from the enjoyable monthly meetings there are often other events to attend, and participate in.

This past month, for example, a few members set up an information booth at the Binbrook Agricultural building. While more details can be read elsewhere in this issue, I might add that it was an opportunity to strengthen our relationship with the management of the Binbrook Conservation Area.

The superintendent is Jim Douglas and, though we've often exchanged e-mails, I welcomed the opportunity to discuss our use of the park in person. An item on both our minds was the new Camp Marydale, a day use facility that the Catholic Youth Organization (CYO) is going to build on the other side of Lake Nipiango. Though the camp is not technically on park property, we were both aware of the possible side-effects of this structure.

Jim's concern was for the waterfowl habitat, while my thoughts were of future parking lot and security lights. HAA member Rob Roy had mentioned this exact possibility about a year ago, but with this new information the HAA council determined that a sensible lighting solution should be presented to the CYO, ASAP. To that end, our representative to the International Dark Sky Association, Observing director Greg Emery, has already made contact and the initial response has been favourably cooperative. In fact, we may hold some future events in conjunction with the camp's activities.

Jim was also cooperative about having a young tree removed from our favourite observing hill. In return, I thought it might be nice if the HAA replaced it with a stone pedestal table. Not only could it be used by astronomers at night, and by picnic'ers during the day, but it would also create a tangible symbol of the Club, in the park.

My vision for the table is a 5' - 6' circular top mounted on a pedestal that is sunk into the ground, pier-like, for stability. The top could be engraved, or have a plaque affixed that says, "Donated by the Hamilton Amateur Astronomers" and also mark the compass points, celestial north, and the latitude and longitude of that spot. This proposal is still in the research phase and if anyone has suggestions or useful contacts for a project like this, feel free to speak up.

Again, this year, the HAA had representation at the Bay Area Science and Engineering Fair. Mike Spicer, a past-winner himself, attended the competition as our

judge of astronomy-related exhibits. His selection for the Club's coveted prize pack was a project about the Doppler effect by Erica Reichl, a grade 7 student at Ste. Therese school in Hamilton. Congratulations to Erica, and many thanks to Mike, Ann Tekatch, Anthony Tekatch, and Jim Winger for their generous donations of time, prizes, or funds.

And, while I'm on the theme of knowing a good thing when you see it - the success of last January's telescope clinic prompted a suggestion that we follow it with an astrophotography clinic. So we will.

Utilizing the same open format, club members who have experience with CCD's, digital and film cameras, spectroscopy, processing, etc., will be on hand to give advice and share ideas. The clinic will be held at the Teamster's Hall from 7:30 - 9:30pm on Saturday, May 13th which, by no coincidence, happens to be a full-moon night.

So, like I said, there's always something going on - all you have to do is just keep looking (us) up!

Clear skies!

Glenn invites your comments on these topics or any aspect of the club. He can be reached via:

chair@amateurastronomy.org

**Activities summary****2006-04-01 April Fools' Slap And Tickle at Binbrook**

by Mike Spicer

I arrived on the hill at Binbrook at 7:20 pm with Heather, narrowly missing Tim Harpur who had gone home minutes before, thinking no one had shown up to observe the occultation of the Pleiades.

It was cloudy, so we didn't set up all the wonderful equipment so carefully laid out, tested and packed up just a few hours before. Rainclouds had passed through early in the day and blue sky had poked through the clouds in the afternoon. "The cloud will break up soon... soon", I chanted to myself as I waited.

Shortly after I arrived a car carrying three more observers pulled up on the hill, telescope safely packed in the trunk. I distributed to all observers, file cards with a labelled chart of the Pleiades on one side, and on the reverse side, the predicted times of ingress and egress for each of the major stars with space to write in the actual observed times. "It's still cloudy... and that's your fault!" declared Tim Philp. But Tim's a luck-struck fellow, and within a few minutes the clouds parted and a lengthy patch of clear sky had us observing the occultation from 8:30 pm for a few precious minutes.

The moon's dark leading edge had already swallowed up Electra, Merope and Alcyone, the northern edge narrowly missing Celaeno (a grazing occultation if you live closer to Barrie). My great interest was the "double occultation" of Atlas and little Pleione scheduled to occur simultaneously at 8:33 pm.

We had a chance to observe Atlas being occulted at 8:35, Pleione already had been gobbled up and extinguished almost a minute earlier. I was remiss in not having the radio turned on and bleeping the time signal from CHU for a more accurate reading. The clouds rolled in again before we could watch bright Alcyone reappear on the right (lit) side of the Moon. Tim followed the sucker hole and caught observations of M42 in his binoculars, so he saw by far the most Messier objects of the night (ie: two... the Pleiades are M45).

The thin crescent Moon's lit side was still very bright - we didn't see any of the Pleiades on that side of the Moon - and as it would fade to invisibility in the clouds, I was struck at how much the tilted Moon resembled the smile of the Cheshire Cat in the Disney movie "Alice in Wonderland". The others chuckled that it wasn't only the Moon that was laughing at our mostly-clouded-out Pleiades occultation.

But we saw it. And there is another excellent chance in July when the early morning's Moon past last quarter, will again occult the Pleiades. I'll be up for that one, too.

2006-04-01 Two Red Spots... What if they Meet?

by Mike Spicer

Now that we have the Great Red Spot and a second red atmospheric storm called "Red Jr", moving relative to the other, ALPO Jupiter observer Michael Boschat of Halifax asked "Is Red Jr. moving enough to overtake the GRS, making it appear as a double type storm system?"

Clay Sherrod of ALPO Jupiter Section replies; "If a conjunction does occur it will not overtake nor merge... such longitudinal conjunctions have occurred many times. ...Morphological changes [are] possible.. [with] change in the dynamic motion/period of the features... [but] in all likelihood, both original features will reform to somewhat of form pre-conjunction."

2006 IS YOUR CHANCE to observe Jupiter with the HAA in warm weather, with fascinating new developments to watch. HAA is a great club because we get together to observe!

2006-04-01 Freaky Fridays for m-lo and my shadow

by Stephen Kinsella

Jupiter has been my favourite planet to observe ever since I had a pair of binoculars. After getting my first telescope, I started to observe transits and look for the Great Red Spot (GRS) as well as all the other events that can be seen on this planet. I caught the double shadow transit in progress the other night and was quite annoyed with myself that I had been caught unawares. To ensure this wouldn't happen

again, I entered all the Galilean moon transits as well as GRS transits for the month of April into my Outlook calendar.

When I switched the view in Outlook to monthly and scanned the entire month, I noticed a peculiar pattern. Early every Friday morning in April, Io and her shadow will be transiting Jupiter. Interesting in itself, but the extraordinary part is the GRS will be transiting or at least prominent on Jupiter during each of these events!

Io will be crossing the northern hemisphere for each and so will not cross the GRS but will still give lots of pretty photo-ops I am sure.

Just what the world needed; another reason not to go to work on Fridays!

2006-03-31 Memoirs of a Science Fair Judge 46th Annual Bay Area Science Fair a Flying Success

by Mike Spicer

Mohawk College hosts the 2006 Science Fair, the gym crammed with over 250 exhibits in six divisions: Biotechnology, Environmental Science, Engineering and Computing Science, Health Science, Life Science, Physical Science and Mathematics. Most entrants were Junior level (grades 7-8), with some Intermediate (grades 9-10) and a few Seniors (grade 11-12).

Over a hundred local professionals acted as judges - including your obedient servant and a large number of employees from Dofasco, main sponsor of this year's fair. As an award winner at the 9th and 11th fairs, and as winner of the RASC award at the 1971 Canada-Wide Science Fair, I wanted to see how the fair had evolved. Most judges were grading exhibits and exhibitors for merit awards; some such as myself were awarding special awards.

I am proud to say that again this year the Hamilton Amateur Astronomers gave an award for a project demonstrating understanding of a topic related to astronomy. The award consisted of a huge astronomy book prize donated by Jim Winger (it's one book I don't have, by the way), an H.A.A. 10th anniversary pin and beautiful Science Fair Award Certificate announcing a one year family membership in our fantastic club, and an electromagnetic radiation poster from Unihedron, mailed to me by Anthony at great expense in an indestructible mailing tube.

Inexplicably there were no astronomy projects at this year's fair. I carefully inspected each project on Friday and came up with a handful that might have some relationship to astronomy. In the afternoon I interviewed the exhibitors to glean whether they had any understanding of how their projects related to astronomy. I discovered that many students got their ideas by copying projects displayed on the internet; maybe that's why there were no interstellar space ships or variable star observations on exhibit.

It was easy to pick a winner for the H.A.A. prize: Erica Reichl, a quiet-spoken, serious-looking, well-read young lady from a local elementary school who exhibited a wonderful project. It mixed grade seven art work with high school

wave analysis in an experimental proof of the Doppler Effect, one of the underpinnings of 20th century astronomy. Her project was delightfully simple and complete, yet raised complex questions of physical science that to this day remain little understood.

Congratulations, Erica and we hope to see you at a meeting of the HAA.

2006-03-31 CATs are running amok at Hamilton Amateur Astronomers

by Mike Spicer

The City of Hamilton thinks fining owners whose cats run loose without a tag will control the number of cats in the city. Meanwhile, CATS are proliferating at Hamilton Amateur Astronomers. They are slewing around at Binbrook as freely as the fat raccoons and skunks, though silently and without the smell.

Mike's Nexstar 11 is back from Celestron in perfect working order (joy!), Clyde acquired a Nexstar 11 GPS for himself this year (a real bargain, too!), Darrell bought Alan Dyer's 9.25" earlier this month, and just this week Tim Harpur bought a sleek new Celestron CG5GT and 8" CAT (so light, so crisp... you'll think your mother baked it!).

If it's clear, tomorrow's occultation of the Pleiades could be a Celestron CAT-astrophe at Binbrook! I hope those CATS don't scratch up the new trees along the road to the Hill...

2006-03-29 Darrell's New CAT gets a workout

by Mike Spicer

Wednesday night 29 March the skies were clear and the seeing excellent at Binbrook Conservation Area. If you count last night, that would be four nights in a row that Binbrook had H.A.A. observers out!

People were waiting in their cars as I unlocked the gate just before 7:30 pm in the lingering dusk. I put the combination lock and set a red LED flashing to let latecomers know which gate to use. We set up on the hill with a couple of Meade LXD go-to mounts for a 5" Mak and a perfect little apo refractor with a Nikon/200mm mounted on top for imaging.

Visitors! Apparently John Gauvureau's Mohawk College class was to meet at the park to do general observing tonight. Some of his class walked up to the hill to observe with us. Darrell arrived after 8 with his BIG NEW CAT, set up quietly nearby and had almost dead-on acquisition of a series of fantastic images, starting with Saturn and the Eskimo nebula. Heather was trying out a new mount for the first time, and enjoyed finding many deep sky objects with her wonderful binoviewer.

Let's keep our fingers crossed that it will be clear Saturday after sunset. I really want to make a video recording of the crescent Moon occulting the Pleiades!

2006-03-29 Double Transit Night on Jupiter!

by Mike Spicer

The Clear Sky Crock claimed the evening would be PERFECT for observing Tuesday 28 March. I arranged to meet friends at Binbrook Conservation Area, notified the park and police. After packing all manner of telescope and imaging equipment and driving out to Binbrook, I set up in the dark, achieved near-perfect polar alignment, and was about to snap my first images of M42 when I looked up. To my dismay it was overcast and about to snow.

I went home determined to write the Clear Sky guys a nasty note... how could they have been so completely wrong? Then about midnight I received word it was clear out and not to forget the double shadow transit of Io and Ganymede across the face of Jupiter! I set up the Nexstar 11 out on the patio... clouds again! To top things off, Jupiter is so low on the ecliptic (-15°) that it does not clear the old tree south of my home. Caught in the branches under mist and haze, Jupiter in the scope looked like a ball of white yarn with brown stripes.

I imaged it anyway. The results were not fabulous but I have sent a stacked image to our webmaster, showing Ganymede beside the planet and its large shadow to the far north on the face of Jove, above and to the right of Io's shadow (Io was just beginning its transit). One cannot let circumstance interfere with results. I hope you all had a chance to see the transit, there aren't many of them this year!

2006-03-27 The wind died and a Toucam was tried at Binbrook

by Mike Spicer

A few H.A.A. members went out to Binbrook after dark Monday night 27 March for a couple of hours' observing and imaging with a 5" Mak, a 4" apo and an 11" SCT. Sky transparency was very good (faint stars were visible) and the seeing was much better than the previous night (the stars of the Trapesium in M42 were not scintillating much, and E and F stars were visible in the 11" even at 90X).

The binoviewer afforded some wonderful views in the evening, but at 9 pm I put a ToUcam Pro on the telescope and took some lengthy images of Saturn for practice. Tim Philp came out to join us about then, looked at some objects in the Mak and then watched as I collected images. Unfortunately clouds rolled in after 10:15 pm and ended the observing session (I am not blaming Tim, they weren't dust clouds from the road).

I have posted a stacked image of Saturn in my gallery together with a copy on which I have noted details of the imaging.

TONIGHT, Tuesday the 28th is looking good for Binbrook, is anyone interested in going out this evening for a couple of hours?

2006-03-27 Saturn & a very abbreviated Messier Marathon

by Ann Tekatch

Unfortunately, we couldn't make it out to Binbrook on Sunday night, so my daughter Alex and I went out in the backyard about 7:00 pm to look at Saturn and whatever else we could find in the evening twilight. Alex was very helpful. The first thing she did was grab hold of the telescope and pull it around to point it up at the sky. Unfortunately, it had been in its "park" position! After I re-calibrated the GOTO system and patiently (!) explained to her that she should let the computer do the pointing on this telescope, we had a look at Saturn.

Alex is getting to be quite an experienced observer, but I realized last night that this was the first time she's ever looked through our big scope. When she looked into the eyepiece, her eyes flew open in wonder and she exclaimed "Mom! That's Saturn!". Saturn was breathtaking at 350X - seeing was easily 8/10 - and even in the twilight, its moons were easy to spot. We spent quite some time together enjoying the view.

Next, we looked at Sirius and then Betelgeuse to compare their colours. Always a neat way to introduce stellar evolution to kids!

Whenever the telescope was slewing around, Alex would play a kind of hide and seek with it. Another stern lecture ensued. This time highlighting the differences between a telescope and playground equipment!

Alex was quite interested in M42 - the trapezium was blazing away in a subtle cloud of nebulosity. But she decided that the Beehive Cluster was very boring. It was time to pack it in and get ready for school/work the next day.

I didn't think of it at the time, but it might be fun to help Alex work on her own Messier Certificate. I wonder if any other parents have experience doing observing projects with their kids?

2006-03-26 It was a breezy, easy Messier Marathon

by Mike Spicer

A balmy afternoon in the sunshine had members of the H.A.A. corresponding about the prospects for a Weekend evening at Binbrook. Several noted that the exceptionally clear skies fell on an evening with absolutely no moon and immediately... MESSIER MADNESS WAS ON US! After all, for how many years has it been clear with no moon in March or April? None, till now.

I hitched a ride out to Binbrook Conservation Area, taking three telescopes with me - an 80mm finder/guidescope, an apo refractor and the 11" Nexstar. My driver and I arrived right at sunset (ie: 6:30 pm) to find a number of observers already waiting to get in! Opening one of the gates, I left a blinking light to indicate that members were already in the park and which gate had the combination lock.



Messier Madness
at Binbrook,
Sun. 26 March 06

We set up in daylight on the Hill, careful not to step on the tiny treelings that lined the road. Tim set up his 10" Schmidt Newtonian and a huge pair of binoculars (for sale, by the way), Mark and Denise set up some comfortable lounge chairs for viewing with their 20 x 80 binoculars (you could make out the stars of the Trapesium in them!), Steve set up his Big Mak, Heather put a smaller Mak on her go-to mount, and a little later, Glenn and Gail set up a small office and 6" scope with wonderful optics.



Big bins at Binbrook
for Messier madness
26 March 2006 starting
after a windy sunset
Photo by Mike Spicer

The sky darkened a little after 7 pm; the Pleiades were high in the sky (memo: next Saturday after sunset, the crescent Moon occults the Pleiades). Members snapped photos of the various rigs; Tim started imaging M42, Steve got out his finder list of Messier objects (aren't setting circles a kind of go-to?). The air was so clean and dry that in the fading light, the sky had that very dark blue colour observers recognize as a night of great transparency.

With the Group of Eight observing on the Hill, three other observers set up at the main gate (not knowing the secret combination to gain access to the park) and were observing Messiers with a 5" go-to telescope (shame!). So we were almost a dozen in all.

After 7:30 it was dark. The light dome of Hamilton to the north did not stop members from looking in great detail

at the Andromeda Galaxy, M81 & 82, M97, M101, M51 and several other objects to the north. M82 really looked good and we could see stars in and around the Owl nebula.



To the south, where the Milky Way was visible, M79 in Lepus was large and clear though not completely resolved. The Eskimo Nebula was remarkably clear and colourful in 14mm eyepieces in the binoviewer (240x) but the central star could be seen easily even at 90x. The Christmas Tree cluster in Monoceros was thrilling. We could spot the coloured stars in M35 and count over two dozen faint stars in NGC 2158, the faint cluster nearby. Leo gave up its Messier galaxies better than I have ever seen them before (it pays to look at objects when they are nearly overhead).

Taking a break from looking at Messiers, the 6" wide disk of Mars was bright and colourful overhead, but Saturn was absolutely spellbinding with all of its satellites gathered 'round like jewels in the darkness. Heather compared the views in several telescopes, noting that in some Saturn had a bright white appearance; she easily spotted Iapetus beside Titan to the W of Saturn, the triangle of Rhea, Dione and Tethys to the E and little Enceladus just N of the rings. Mark mentioned that the rings will be edge on in a couple of years; 2006 may be your last chance for many years, to see the rings in their tilted glory and to trace the Cassini Division all around the planet!

A breeze blew from the W across the hill all night. What started out at a pleasant 7°C became penetrating cold by 10 pm. Parkas, scarves and mittens were DE RIGEUR. Telescopes shook ever so slightly in the wind (I removed my scope's dew shield). Fingers, toes, shoulders and Mark's Tim Horton's giant coffee turned cold. We all came to see that it was not possible to stay up all night in the wind.

I think Tim shot pictures until his 1 gig camera card was filled. I had imaging equipment but didn't use it because the seeing was poor (4 to 5 arc seconds). As the chilly evening wore on with Arcturus and then Jupiter rising in the East, we captured spectacular views of a number of galaxies and globular clusters before packing it in before midnight - after

all, H.A.A. is composed of people going to work tomorrow morning!

We weren't the only active observers at Messier Madness. We spotted several animals on the road on the way home, and Heather gave the observers at the gate information about H.A.A. encouraging them to come out to a meeting (new members soon?)

I have sent Anthony our Webmaster some photos for posting on the site. I look forward to seeing more of Tim's beautiful photography in his gallery. All in all, it was an excellent Messier Observation evening, well attended because H.A.A. MEMBERS ARE AVID OBSERVERS!

2006-03-26 Images from Binbrook

by Tim Harpur

Well, it was a nice night at Binbrook - a half dozen or so members showed up with a variety of scopes and binoculars. I did my usual and spent most of the evening imaging. I haven't processed any of the shots yet, but having glanced at the images as I downloaded, it would appear I have good shots of the Andromeda Galaxy, the Leo Trio Galaxies (M65, M66, NGC3528), the Sombrero Galaxy, the Crab Nebula, and M3 (globular cluster). Once I've had time to process the images I will post them. Anyhow, it's been a late night and I've got work tomorrow.

Update Monday March 27/06

I've processed the Leo Trio and they turned out well with all 3 galaxies in the field of view this time. I've started with the others and will post them to my gallery tonight. Andromeda, which was rather low on the Western (or North Western?) horizon, is seriously lacking contrast and in the end did not turn out to be a very good - only the core showed to an appreciable amount.

2006-03-22 Never Seen a Variable Star? Sure you Have!

by Mike Spicer

R Leonis coming to Maximum

Of course we all have seen variable stars, but have we recognized them and determined their brightness? Variable stars change in brightness as time passes, some quickly and some very slowly. The latter stars are mostly red giants and become brighter and fainter over a period of many months. They are easiest to find when they are at their maximum brightness. In March and April, R Leonis is near maximum.

R Leonis is a red long-period variable that is easy to observe. It varies from 5th magnitude to 10th magnitude over its 313 day period and if you plot its brightness over time, you can see a regular, repeated "light curve". Binoculars are all you need to watch R Leonis. R at 331 light years away is one of the nearest Mira-type variables.

R Leonis is approaching maximum brightness in the next few weeks. It is very easy to find, just 5° west of Regulus, the brightest star in Leo, and Leo is high in the sky to the south about 10 pm. When R Leonis is faint, it forms a small triangle with two 9th magnitude stars just 4' W and S (they are

still there when R is bright, but you may not notice them!). R Leonis was the very first variable star seen by world famous variable star observer and author Leslie Peltier with whom I corresponded when I was just starting out.

If you have a go-to scope, you can find R at 09h 48m, +11° 24'. If you don't have a go-to or want accurate comparison stars for estimating R's brightness when you observe it, please download and use the free charts for R Leonis, I suggest the "B" chart which can be found at:

www.aavso.org/charts/LEO/R_LEO/RLEO-B.GIF

AAVSO has a great article on R Leonis at "Variable Star of the Month":

www.aavso.org/vstar/vsots/0401.shtml

Go to the AAVSO web site (www.aavso.org) to get the most recent light curve for R Leonis. Select "Create a light curve" and type 0942+11 (AAVSO designation for R Leonis) into the "Pick a Star" box on the left hand side of the main page.

At the moment R is 7th magnitude, but at maximum in mid-April it reaches 5th magnitude - a red naked-eye object!

Notes from the backyard Monday March 20, 2006

by Stephen Kinsella

It was a cold and breezy evening as I started to setup my 8" Mak and I began to become concerned as to the comfort level of the evening's observing ahead. Being an eternal optimist, I set up on the lawn and not on the patio. This gives me the same eastern view but I can follow objects past transit without the house getting in the way. It also requires setting up tarps to block the neighbourhood street and house lights. If the wind continued to gust, I might have to scrub the session.

All the positive thinking paid off and it became quite calm around 10:30. I set up the tarps and started observing Saturn. It had passed transit and I was glad the scope was on the lawn. The seeing was poor; I had trouble seeing the Cassini division all the way around, even with the Ultra Wide 8.8mm. I thought I had found 6 moons tonight, but the interloper on the eastern edge of the eyepiece turned out to be an 11th magnitude field star.

By 11:30, I could make out Jupiter rising above the neighbours' homes and by midnight I moved the scope for a look. At first I had a look with my 52mm Erfle. This gives a nice 1 degree field of view with the Mak and I could see Jupiter's 4 brightest moons, 2 above and 2 below. I found the view in the 8.8mm was too bright, so I got out a neutral density filter and could see some nice detail in the bands and Io was easier to see as it was approaching Jupiter. I had intended to catch Io disappear, but needed to get warm at the wrong time.

By this time, I could see Vega high in the east and decided to have a look at M57; the Ring Nebula. The 52mm Erfle showed a very distinctive ring amongst a field of stars and the 8.8 mm gave a larger but washed out view. Why? When I glanced over my shoulder, I could see the gibbous moon rising in the southeast.

I next turned my attention to the Hercules Cluster. The moon's influence was far less while looking at M13. The core of this globular was bright and individual stars could easily be seen. I never tire of looking at it

As the moon continued to rise in the south, the advantages of the tarps became increasingly diminished. You really didn't need a flashlight at this point and I knew the session would end soon, so I went comet hunting. I had spotted Comet Pojmanski the other morning with my 7x35 binoculars and was hoping for a treat to end the night. Unfortunately, Cygnus was still low on the horizon and sweeping the sky with both the 70mm finder as well as the 52mm Erfle came up empty.

By now, it was 3:30; I was tired, cold and wishing I didn't have to pack it all up. Still, practice has taught me to be efficient and I had the site packed up and put away by 4. Even our cat, who generally loves to lurk near my feet when I come in the door, scurries at the sight of me carrying the tube through the door!

It was cold, the seeing was less than perfect, but it had been nice to get out with more than just binoculars for a change.

2006-03-19 HAA display at Binbrook Agricultural Centre

by Mike Spicer

Binbrook Conservation Area held a fund raiser for its Raptor Centre on Sunday afternoon, 19 March 2006 from 1 to 4 pm at the Binbrook Agricultural Centre. Hamilton Amateur Astronomers turned out in force to lend support.



Photo by Sandy Maude

The Agricultural Centre is on Binbrook's main drag (#56) right beside the new Police and Fire Station. A marvel of design, the large auditorium has stadium-type bleachers for a roof and North wall! Hundreds of local people attended this event to learn about the care of raptor-type birds at the conservation area, and to pick up great objects at the auction.



Photo by Tim Harpur

H.A.A. was one of the groups that set up displays around three walls at the event. Glenn and Gail prepared an excellent slide show that ran non-stop through the afternoon; there were three telescopes set up for hundreds to admire, a 6" dobsonian, a 5" refractor and a 10" schmidt-newtonian. Books, pamphlets and H.A.A. business cards were there for viewing or taking home.



Photo by Glenn Muller

Our thanks to Glenn and Gail for setting up and to Heather Neproszel, Tim Harpur, Darrell and Sandy Maude, Mike Jefferson and Mike Spicer for coming out to help answer questions from an interested crowd. Having H.A.A. members come out to these community events for public outreach is one of the things that makes Hamilton Amateur Astronomers the greatest!

2006-03-18 Whoa! It'S the Big Refractor

by Mike Spicer

I have been a Schmidt-Cassegrain user for many years, used to sitting comfortably while observing a rather narrow field,

high-magnification view of the sky. Planets, globular clusters, double stars and planetary nebulae were natural prey for the large aperture, long focal length of the SCT.

Some months ago I acquired a 5" apo refractor and then a 6" Meade achromat refractor to put on my massive and very accurate LXD-750 mount. 65 pounds of counterweight balanced the two scopes, one on top of the other. A two-scope set-up, it usually sat in my office, intimidating visitors.

Tim Harpur said it was windy, so I decided to set up the LXD-750 on the patio tonight. Wind up to gale force has little effect on the 750. The Meade Giant Tripod is heavy with its 3" diameter steel legs. The LXD-750 mount is very heavy, too, but easy to set up on the tripod and with a polar alignment scope, easy to align. I added an extra 5 pound weight to the one inside the focus assembly of the 6" refractor, so the tube is balanced more or less in the middle. The 5" apo sits atop the 6" cradle in a set of guiding rings.

I'm not a refractor observer. The tubes are just so long on big refractors, you can't sit comfortably as you look around the sky. The field of view in a refractor is so wide and everything looks so small. Saturn, for example... I could see the Beehive and Saturn in a 40mm SWA. The planet was tiny but so bright it hurt to look at it.

I switched to a 7mm eyepiece with a moon filter and got a much better view of Saturn... but where were all the little moons I see in the 11" scope? Only 4 were visible in the 5" apo, what a disappointment! I must say the view was crisp and the planet's rings were very well-defined in both refractors.

Comparing the 6" achromat to the 5" apo was fun. The 6" collects about half again as much light, so the images were much brighter. There was a little splash of light around Saturn in the 6" due to lower contrast, and a bit of false colour around bright stars. None of that in the 5" apo of course. But the 6" was excellent on lesser stars and faint galaxies like M65 and M66, which I couldn't make out in the 5" from inside the city. The 6" achromat with a Minus-violet filter comes closer to performing like an apo scope, but there's always a distinct superiority of view in the 5" - the real thing.

The LXD-750 mount is made in the USA and resembles the Parallax Millennium mount costing ten times as much. It handles 65 pounds of telescope very well and moves very smoothly on its multi-bearing axes. The go-to controller is very accurate and doesn't cut out in the cold; in fact, holding it keeps your hands warm!

It was fun using the big refractors tonight. I would have seen a lot more if I had set up the Nexstar SCT, but every scope should get out sometime!

2006-03-18 Transits of Jupiter's Moons

by Mike Spicer

Are you a Jupiter observer?

Jupiter commands attention now as it approaches opposition. It's low in the Eastern springtime sky before midnight. Some observers like to image the transits of moons on the

disk of the planet, or even make little movies of these events against the backdrop of the planet's colourful cloudbands.

A couple of years ago the orbits of Jupiter's moons were perfectly aligned with Earth, and all four moons transited the disk - you could even see the moons occult EACH OTHER as they orbited the planet.

This spring, the planet is tilted about 3° to Earth and Callisto (the moon furthest from Jupiter) passes north of the planet instead of transiting. Ganymede just grazes the northern cap of the planet, and its shadow is the largest one you will observe. Io and Europa will still provide a fine transit display. The moons cast a shadow on the planet - preceding the moon until opposition in early May, after that the shadow follows the moon across the planet's disk.

There are no triple transits this season, but TWO moons transit at the same time occasionally:

- April 8 Europa starting about 3 a.m.
- April 12 Io and Ganymede, starting about 5 a.m.
- April 13 Io starting about 11:30 p.m.
- April 15 Europa, starting about 5 a.m.
- April 19 Io starting about 7 a.m.
- April 21 Io starting about 1 a.m.
- April 22 Europa, starting about 7 a.m.
- April 28 Io starting about 3 a.m.

Note: for about a week the shadow of the moon will appear close to it, but after May 5th the moon will precede the shadow across Jupiter.

- May 2 Europa starting about 11 p.m.; Jupiter is 7' N of NGC 5756
- May 3 Ganymede just grazes the planet's N pole at 9 p.m.
- May 5 Io starting about 4 a.m.
- May 6 Io starting about 11 p.m.
- May 10 Europa, starting about 2 a.m.
- May 11 Ganymede grazes the N pole just after 00 hr
- May 12 Io, starting 6:30 a.m.
- May 14 Io, starting about 1 a.m.
- May 15 Io, starting 7:30 p.m.
- May 17 Europa, starting 4 a.m.
- May 18 Ganymede, about 3:30 a.m.
- May 21 Io about 2:30 a.m.
- May 22 Io, starting 9 p.m.
- May 27 Europa starting 7:30 p.m.
- May 28 Io starting 4:30 a.m.
- May 29 Io starting at 11 p.m.

Enjoy!

2006-03-16 Jupiter - naming the Moons - Jovian Moons in Order

by Mike Spicer

Jupiter season has started and there are features on the disk of Jupiter of note, some old, some new. The Great Red Spot hanging on the S edge of the South Equatorial Belt, is a little redder at its centre this year, and has been joined by "Red Spot Jr", formerly the white oval spot BA about 10° further S and 60° E of the GRS. The three dark "barges" on the S

edge of the North Equatorial Belt are still prominent, as are three small white ovals in the South Temperate Belt.

In any telescope, four moons are prominent: Io, Europa, Ganymede and Callisto, in order of their distance from the planet. Space probes have shown that each moon appears different, but they look like stars in most telescopes. Which is which? At public nights I am often asked to name them... and occasionally the moons line up in order...

Wed., March 22nd all night long, I E G C will be lined up E to W from Jupiter, with G and C each at seeming apogee (furthest from Jupiter in their orbits) and from 9-11 pm Io will be eclipsed by the planet.

Fri., March 24th all night, E G C are to the W of Jupiter, while from 9:30 pm till 1 am, Io transits from E - W across the face of Jupiter, preceded by its shadow (very black since Io is the moon closest to the planet);

Mon., March 27th in the pre-dawn hours the moons are lined up E to W as C G E I (so, in reverse order of distance) as Io is eclipsed by Jupiter's shadow and then by the planet's disk, from 3-6 am;

Wed., April 5th starting at 10 pm, I E G C are lined up E to W to the W of Jupiter and Io again is eclipsed by Jupiter from midnight to 3 am

Sun., April 9th after 1 am the moons are in order E to W but are more evenly distributed with I and E east of Jupiter, G C to the west; Europa and its shadow cross the disk of Jupiter from 2-6 am that morning.

Perhaps it's the "transits" of moons across the face of the planet you prefer to watch. There are three "double transits" in the next few weeks, with Io and Ganymede both crossing the disk of Jupiter, on March 21 from 11 pm to 2 am on the 22nd; March 29th starting at 1 am; and April 5th starting at 3 am for those who get up to observe before breakfast.

Enjoy!

2006-03-12 Bright Asteroids for Clear Nights!

by Mike Spicer

Asteroids are solar system rocks up to a few hundred miles in diameter that occasionally pass between us and visible stars. If the eclipse event is accurately measured, it's possible to identify the shape of the asteroid and whether it has a "moon". According to the experts, there are no asteroid occultations for our area in the next month.

If you have never seen an asteroid, a few bright ones are available in the night sky for the next few months. I mentioned VESTA in my January 2006 talk on Saturn. JUNO at 8th magnitude is near the "head" of Orion (Lambda Orionis) at present. Two smaller asteroids that are bright this year, Metis and Harmonia, are both in the constellation Leo at the moment.

Charts for asteroid movements are available from the RASC national web site, but you likely have star-chart software on your computer that will show them - if you don't, you should show up for the April HAA meeting at the Spectator auditorium - I think we have door prize CDs of Starry Night to give away!

Perhaps you are an imager and want to capture an asteroid passing by a faint galaxy...METIS will buzz NGC 3447, 3454 and 3455 on March 17-18; NGC 3370 on 27 March and NGC3377 on May 17th... HARMONIA will be in the same field of view as M65 and 66 in Leo on March 19th, NGC4123 on July 19th. The galaxies should show on a 20 second exposure with your CCD camera if you are imaging from a fairly clear, dark sky. To show the asteroid's movement, you will need to stagger images over at least one hour period and then stack them. Astronomy can be fun!

There's Warmth and Breadth at HAA HAA March meeting report

by Mike Spicer

The beginning of the March break, weather was 10° above normal and Walt Disney World offering cheap Florida family vacations... yet several dozen of us were drawn to the March HAA meeting at the Teamster's Hall.

Perhaps it was the great observing opportunities of the past two weeks, after months of cloud and cold. Perhaps it was the opportunity to get an observing report-packed copy of the club newsletter, *EVENT HORIZON*. Perhaps it was the draw of three excellent talks, provided by our own members. Maybe it was the half-dozen great door prizes - we ARE showing up earlier... or perhaps it was the after-meeting socializing, washing down nacho chips with a tall, frosty one and trading stories from the past month, or discussing new astro-equipment. Something drew us... and excellent attendance at the monthly meetings and at observing nights is part of what MAKES H.A.A. a GREAT ASTRONOMY CLUB!

Our Observing Director Greg Emery reviewed the soon-to-be-famous HAA List... 300+ observing targets above -30° declination, including galaxies, nebulae, clusters, double and variable stars brighter than magnitude 12. Greg hasn't seen them all himself and challenged us to get out observing, and asked us to contribute new objects of interest to the HAA List, which will be available under "TOOLS" on our web site. There was a suggestion that HAA offer Certificates to people who work their way through some of the List and this may entice any Certificate-collectors among us.

So many door prizes were won at the meeting, I couldn't keep track of all the winners - why, even I was holding a winning ticket, though the prize belonged to someone else. Thanks to those who donated excellent prizes, and have no fear - there are plenty more fabulous door prizes for future meetings, says Glenn. Everyone arriving before our 7:30 pm start time gets a draw ticket.

Glenn did a presentation using Excel to keep an observing log - easy to use and a great way to keep pithy records of your observing nights - another free download from TOOLS on our web site. I'd like to see Glenn's records - he is an avid observer and his would list virtually all the clear nights for the past four years. He and Gail braved the wind, observing at Binbrook Conservation Area just last Friday - the first Binbrook night of 2006..

Tim Philp combined great public speaking, a voracious appetite for historical data and the ability to use a power-point pointer to expound on the Five Books that Changed

the Way we Think about our Universe - a sort of Pentateuch of Astronomy. Actually, he started with Aristotle and worked his way to Einstein, so there were more than five books involved. THEY STOOD ON THE SHOULDERS OF GIANTS rather like big Dob-owners, while Tim sat comfortably on the dias, like a cassegrain-owner.

Mike Jefferson had a beautiful and interesting display of more spectroscopic photographs (especially Vega). Mike Spicer was selected to be Astronomy Judge at the Science Fair later this month. Tim Harpur proudly displayed some excellent digital images of M42 taken with his 10" Schmidt-Newtonian telescope and 35mm T-adapter (worth buying, eh?)

TWO ANNOUNCEMENTS:

Mike Spicer mentioned that the early evening of April 1st - actually, starting at dusk, the crescent Moon will move through and occult the Pleiades, an excellent opportunity to image and record this beautiful sight. You'll need a clear western horizon, so some places are out-of-luck. Binbrook would be a perfect imaging location and all are welcome.

Glenn forgot to draw attention to the fact that our April meeting will be held on April 7th and NOT on the 14th (which is Good Friday), although he pointed out that the meeting will be at the Spectator Auditorium and not at the Teamster's Hall (E.&O.E.).

Testing the Air, 7 March 2006

by Mike Spicer

Predictions were not good for Tuesday night 7 March - another bright sunny day with increasing haze and low cloud, becoming overcast after midnight. I set up at dusk, checking the Trapesium in Orion to determine that the seeing was poor with scintillation 5+ arc-seconds and only 4 stars visible!

I had planned to set up a big Meade LXD-750 go-to mount with a 6" refractor and a 5" apo refractor piggy-backed on it... but the Nexstar is so easy to fix on its wedge outside on the patio, and I found that I'd set that scope up instead of the refractors. Perhaps another time. Based on images I have obtained with a little ED80 scope, I am sure the DSI will get great images through the big refractors.

Saturn presented an opportunity for imaging with the Toucam Pro webcam and early in the evening I was able to obtain some very good images despite the poor seeing... now, how could that be? Waves of low haze were visible overhead, with very few stars peeking through...and yet the images of Saturn were good. Lesson: persevere despite apparently adverse conditions. I sent a few of tonight's Saturn images to Anthony, our superb webmaster.

2006-03-07 Observer's Report on the F/1.9 Experience

by Mike Spicer

IF ONLY THERE WAS A FOCUSER...

A cold, windy night was predicted for Monday 6 March. Lots to see, but I'd probably have to observe all alone. In poor seeing, a good night to fiddle around with imaging at f/1.9.

The Nexstar 11 GPS telescope has fastar optics, meaning you can remove the secondary mirror, leaving a gaping hole in the corrector plate. Into the hole you put a special lens assembly (US\$650) with a T-thread to which you attach a CCD camera for imaging at F/1.9. It all sounds so easy...

... but there isn't any focuser at f/1.9 and getting the camera to focus in the cold means a lot of trial-and-error. Tighten something too much and the corrector plate could crack or the images appear "bloomed"; not tight enough and the camera could fall down onto the corrector plate... and there's always more "tweaking" the focus.

I use a Meade DSI one-shot colour camera although I do have other CCD cameras, including an ST-237 camera that the fastar was designed for. The DSI is sensitive and easy to use - but hard to focus. The tiny IR filter can twist out of alignment (it should be round, not square, if you ask me).

The Nexstar went back to Celestron last fall for new computer boards and realignment of the optics because fastar images appeared "bloomed"...now back after much correc-

tion, the system appeared to work perfectly once focus was achieved without overtightening. The seeing was not very good, but collimation was perfect at f/10 and at f/1.9 and I was able to capture an image of Saturn's little moon Phoebe, a couple of galaxies and the little open cluster NGC2158 not far from M35 in Gemini.

Upcoming Events

The next HAA General Meeting will be held at the Hamilton Spectator Building on Friday May 12, 2005 7:30pm. More details here:

www.amateurastronomy.org

Please welcome new HAA members:

- Jack & Kathy Verzyden.
- Ms. Erica Reichl

TURNBULL'S TOP TEN LIST

by Glenn Muller

At a recent meeting of the American Association for the Advancement of Science, Margaret Turnbull, a postdoctoral research associate at the Carnegie Institute of Washington, unveiled a top ten list of nearby stars likely to host life-bearing planets.

Due to her position with NASA's Astrobiology Institute (Department of Terrestrial Magnetism), and work with the privately-funded Search for Extra-Terrestrial Intelligence (SETI), Turnbull's *top ten* list is actually two groups of five that were culled from a field of 17,000 "possibles". Turnbull suggested that five of the candidates would be prime targets for radio astronomers hoping to detect signals from "intelligent" sources, while the other five stars are within reach of those looking to detect extra-solar planets.

To make the list, stars had to be at least 3 billion years old to give complex life time to form; have at least 50% of the iron content of our own Sun, a crucial element in Earth-like planets; and be similar in size, mass, and spectral classification. It also helped to have an absence of large companion, or nearby stars that could perturb the stability of a solar system.

Stars on Turnbull's list will be among the first targets for NASA's Terrestrial Planet Finder; a system of two orbiting observatories scheduled for launch in 2014 and 2020. However, all of the candidates are bright enough to be seen with amateur scopes, and seven are visible from the Northern Hemisphere.

If you've been thinking of starting your own SETI program, the list below has been sorted by declination. Just remember, that when you spot someone looking back at you, the etiquette is to smile and wave! "*Nanoo, Nanoo!*".

Catalogue	Constellation	Right Ascension	Declination	Light Years Away
HD 10307	Andromeda	01h 42m 10s	+42°38'41"	41.22
HD 109358	Canes Venatici	12h 34m 02s	+41°19'25"	27.35
HD 217014	Pegasus	22h 57m 46s	+20°48'08"	42.00
HD 26965	Eridanus	04h 15m 33s	-07°38'38"	16.38
HD 146233	Scorpius	16h 15m 57s	-08°23'08"	45.71
HD 22049	Eridanus	03h 33m 13s	-09°26'14"	10.50
HD 10700	Cetus	01h 44m 21s	-15°54'17"	11.88
HD 211415	Grus	22h 18m 39s	-53°35'51"	44.35
HD 209100	Indus	22h 03m 39s	-56°45'37"	11.82
HD 128621	Centaurus	14h 40m 04s	-60°51'51"	4.36

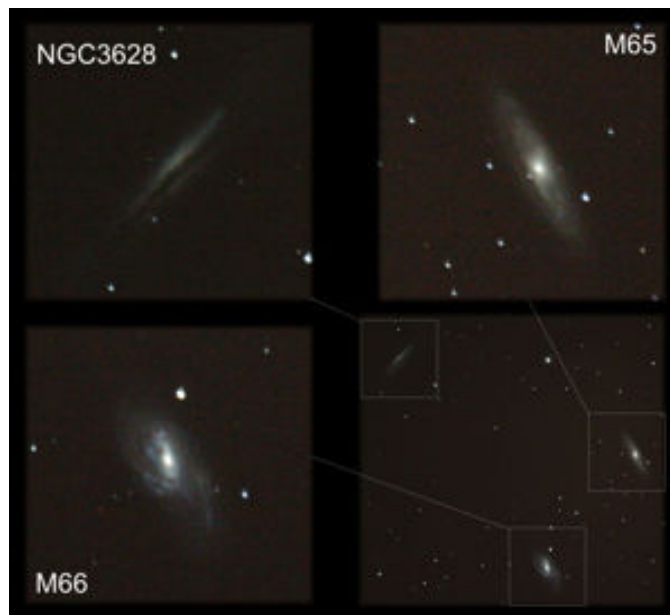
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Example of 3 separate sequences of images shot at ISO 1600 for 30s, ISO 1600 for 10s, and ISO 800 for 2s - individual sequences stacked then the results blended together.

At this time I was satisfied with the results I was achieving with Orion and decided it was time to try imaging other DSOs - the Pleiades weren't too difficult (except trying to capture all 7 primary stars in the FOV), but other fainter DSOs proved to have severe problems with focusing. More often than not I couldn't even see what I was imaging until after doing an exposed shot - and then I would have to tweak the focus - and repeat until I got the focus right. This was complicated further with the DSLR as once again the resulting image I was looking at was tiny on the camera's CCD display (this is one major advantage a CCD astro-camera has over a digital camera). After trial and error I have settled on a technique that seems to work reasonably well. First, locate the object visually, if possible, using an eyepiece - or at least locate the region of sky. Then note the relative position of nearby bright stars in the finder scope and slew to one of them. After attaching the camera, focus on this bright star - still a little tricky with such a small view as seen through the camera's finder, so this becomes a process of over focusing in both directions and then finding the "mid point" where the star is a tiny sharp dot. Having focused the camera on a bright star will ensure the camera is focused at infinity - the same for all objects up there - some people use a Hartmann's mask to help with this procedure. Then slew back to the target region using the finder scope - this isn't always accurate and a few

shots with the camera are usually required to re-center the target in the FOV. Remember, with a DSLR take as many shots as necessary to get it right - once you've bought the camera (and the telescope, and the adaptors, and....) the rest is free.



Example of other fainter DSOs taken using the above technique - the Leo Trio (or Triplet).

I had one advantage with my 10" SN OTA - it was a fast f4 - and most of my exposures were only 30 seconds in length and unguided. Now that I'm switching to a slow f10 8" SCT - my next goal is to practice using a guide scope for really long exposures. I will keep trying and learning - and posting the results to my gallery.

Tim Harpur, has held an interest in science and astronomy from a young age, and studied science (including courses in astronomy and astrophysics) at the University of Waterloo and holds a BSc. Since joining the HAA last fall, his interest in astrophotography has been rekindled with his new Meade 10" SN LX75 (GT) and Canon Digital Rebel XT for the imaging. He spends a lot of cold nights alone with his new scope - but enjoys the results!



The Cranky Curmudgeon Questions Relativity

by Bill Tekatch

Since Albert Einstein first published his relativity theories in 1905, those theories have experienced an unblemished record of passing every test ever done to prove them. Is it that his theories are correct? Could it be that the tests were biased? Is there a conspiracy “X-Files” style to only do tests that people know ahead of time (no pun intended) will work? Let’s set the conspiracy theory aside for the moment. In reality, all of the test results to date are amazingly convincing. How could this be? Einstein himself knew his work was not complete. He tried unsuccessfully to meld together relativity and the quantum world. He felt that the Cosmological Constant was his biggest blunder. So today many still toil to cobble together a Grand Unified Theory.

With all that said, let me now throw a speck of dust into the eye of relativity. Here is a test that has not been done to my knowledge. The test is to accelerate an electron and anti-electron (positron) in the same direction to the same speed and let them combine to form the atom-like Positronium. The Positronium has a half-life of 100 to 150 nanoseconds that ends with annihilation that usually produces two diametrically emitted gamma ray photons of 511 keV. Depending on the conditions the annihilation may rarely produce more photons. Sometimes as many as five photons are produced. Not being a nuclear physicist, I can’t understand the annihilation producing more than two photons, so I will stick with two. The story is quite different when the electron and positron are traveling in opposite directions at high speed and meet. Their momentum or kinetic energy can be converted to mass if they have enough energy. When the energy is high enough, a neutral Z boson may form that then produces a D^+ and D^- meson pair.

So what experiment result does relativity theory expect? According to relativity, the electron and positron traveling together in the same direction and speed should behave the same as if they were not moving. Therefore we would expect to see those same two diametrically emitted gamma ray photons of 511 keV, of course appropriately red or blue shifted due to the direction they are emitted. There will be a large blue shift when the particles are accelerated to near light speed, as the photons must carry all of the kinetic energy plus the 511 keV. The photons must be diametrically emitted. Other particles such as the neutral Z boson and mesons should not be evident at all. Should any result not be obtained as expected, it would call relativity into

question. Newton’s theory was mostly correct, and Einstein’s even more correct, and until we find where the limit to relativity theory is, we are stuck. So if the experiment does show a flaw in relativity, that is a good thing because it may show us the way to advance. Now let’s note the flies in the ointment. Remember the 100-nanosecond half-life of Positronium? Well at the speed of light you would travel 30 metres in 100-nanoseconds. Worse yet, the time dilation effect becomes significant as velocity approaches light speed. Even if a particle accelerator was available that could do the experiment, it would need a very long detector. These problems may make this experiment even more difficult than finding the top quark.

Sometimes it is just a matter of perspective.

Bill Tekatch is a founding member of the HAA, ran the Cosmology Discussion Group for some time, and has written several articles on cosmology.



Last months meeting

by Sandy Maude



For Sale by Tim Harpur
(905) 466-6565
 or tharpur@cogeco.ca



Meade B&W Electronic Eyepiece - condition: unused - \$45



ScopeTronix EZ-Pix Universal Camera Mount - condition: new - \$40



Celestron SkyMaster 25x100 Water-proof Binnoculars w/carrying case - tripod NOT included - condition new - \$350 or reasonable offer.



Meade 26mm Eyepiece - condition: unused - \$40



10" Meade Schmidt Newtonian OTA with UltraHighTransmission-Coatings - includes 8x50 viewfinder and dovetail cradle rings (mount not included) - condition: excellent - asking \$800 or reasonable offer.

For Sale by Mike Spicer
deBeneEsse2001 at AOL.com
 or 905-388-0602





Planets in Strange Places

By Trudy E. Bell

Red star, blue star, big star, small star—planets may form around virtually any type or size of star throughout the universe, not just around mid-sized middle-aged yellow stars like the Sun. That's the surprising implication of two recent discoveries from the 0.85-meter-diameter Spitzer Space Telescope, which is exploring the universe from orbit at infrared (heat) wavelengths blocked by the Earth's atmosphere.

At one extreme are two blazing, blue "hypergiant" stars 180,000 light-years away in the Large Magellanic Cloud, one of the two companion galaxies to our Milky Way. The stars, called R 66 and R 126, are respectively 30 and 70 times the mass of the Sun, "about as massive as stars can get," said Joel Kastner, professor of imaging science at the Rochester Institute of Technology in New York. R 126 is so luminous that if it were placed 10 parsecs (32.6 light-years) away—a distance at which the Sun would be one of the dimmest stars visible in the sky—the hypergiant would be as bright as the full moon, "definitely a daytime object," Kastner remarked.

Such hot stars have fierce solar winds, so Kastner and his team are mystified why any dust in the neighborhood hasn't long since been blown away. But there it is: an unmistakable spectral signature that both hypergiants are surrounded by mammoth disks of what might be planet-forming dust and even sand.

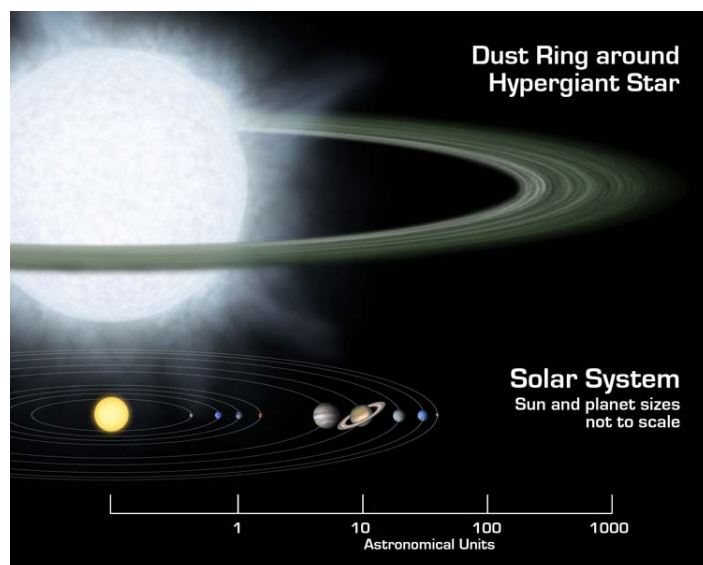
At the other extreme is a tiny brown dwarf star called Cha 110913-773444, relatively nearby (500 light-years) in the Milky Way. One of the smallest brown dwarfs known, it has less than 1 percent the mass of the Sun. It's not even massive enough to kindle thermonuclear reactions for fusing hydrogen into helium. Yet this miniature "failed star," as brown dwarfs are often called, is also surrounded by a flat disk of dust that may eventually clump into planets. (Note: This brown dwarf discovery was made by a group led by Kevin Luhman of Pennsylvania State University.)

Although actual planets have not been detected (in part because of the stars' great distances), the spectra of the hypergiants show that their dust is composed of forsterite, olivine, aromatic hydrocarbons, and other geological substances found on Earth.

These newfound disks represent "extremes of the environments in which planets might form," Kastner said. "Not what you'd expect if you think our solar system is the rule."

Hypergiants and dwarfs? The Milky Way could be crowded with worlds circling every kind of star imaginable—very strange, indeed.

Keep up with the latest findings from the Spitzer at www.spitzer.caltech.edu. For kids, the Infrared Photo Album at The Space Place (spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml) introduces the electromagnetic spectrum and compares the appearance of common scenes in visible versus infrared light.



Artist's rendering compares size of a hypothetical hypergiant star and its surrounding dusty disk to that of our solar system.

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

Council meetings

All club members are welcome to attend the council meetings. Contact info@amateurastronomy.org for details.