



The Andromeda Galaxy (M31), and its two satellite galaxies M32 and M110 make great observing targets during November and December.

Photo by Gary Kronk.

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River Bend Astronomy club serves astronomy enthusiasts of the American Bottom region, the Mississippi River bluffs and beyond, fostering observation, education, and a spirit of camaraderie.

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Affiliated with the Astronomical League, dedicated to fostering astronomical education, providing incentives for astronomical observation and research, and assisting communication among amateur astronomical societies. www.astroleague.org



Check out our online calendar on the NASA Night Sky Network, a nationwide coalition of amateur astronomy clubs bringing the science, technology and inspiration of NASA's missions to the general public.

Monthly Meetings

Saturday, November 10, 2012 • 7:00 PM
Saturday, December 15, 2012 • 7:00 PM
Saturday, January 12, 2013 • 7:00 PM

For meeting locations, please see our calendar at www.riverbendastro.org.

Looked Up Lately?

Join River Bend Astronomy Club

Want to learn more about astronomy? The members of River Bend Astronomy Club invite you to join. You won't need expensive tools or special skills - just a passion for observing the natural world.

- Meetings offer learning, peeks through great telescopes, and fun under the stars.
You will receive the club newsletter, Current Astronomy, packed with news and photos.
Get connected with our member-only online discussion group.
Borrow from the club's multimedia library.
Borrow from the club's selection of solar telescopes.
And that's not all! Through club membership you also join the Astronomical League, with its special programs and colorful quarterly newsletter The Reflector to enrich your hobby.
We meet monthly, observe regularly, email news and quips constantly, and generally have a good time. Won't you join us?

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____
Email address _____
Where did you hear of our club? _____

How long have you been interested in astronomy? _____
Do you have optical equipment? _____
Are you afraid of the dark? ___Yes ___No (just kidding)
I am submitted my application for:
_____Adult Membership(s) _____Youth Membership(s)
\$20/year each \$15/year each
(18 yrs. and up) (17 yrs. and under)
I enclose a check for \$_____ made out to:
Mike Veith, Treasurer, RBAC
Signature _____
Date _____

Mail to: River Bend Astronomy Club
c/o Mike Veith, 1121 St. Louis St., Edwardsville, IL 62025.

Questions? Contact us by email at rbac@riverbendastro.org.

Two Members Receive Astronomical League's Outreach Awards

By Bill Breeden

The Astronomical League offers awards for members of astronomy clubs and societies who participate in certain levels of public outreach.

Public outreach is simply the act of sharing our love for the universe with members of the public. It can be as simple as pointing out Venus to park visitors, or displaying and explaining how to read a star chart. It can also be as elaborate as setting up a large telescope for members of the public to look through. The possibilities for sharing the universe are truly endless!

Bill and Rita Breeden, members of both the River Bend Astronomy Club and the St. Louis Astronomical Society, received awards from the Astronomical League for their outreach efforts. Carroll Iorg, the League president, presented the awards on September 21, 2012.



Pictured from left to right: Mark Jones, Don Ficken, Carroll Iorg, Bill Breeden, and Rita Breeden. Photo by Jim Small.

The League has three levels of Outreach Awards. Outreach, the first level, is awarded after a member achieves 10 hours of public outreach at a minimum of 5 different events. Stellar, the second level, is awarded for members who achieve the Outreach level plus an additional 50 hours of outreach activity.

Stellar award recipients must also turn in a report on one of his or her outreach events.

In addition to the Outreach and Stellar Awards, a member may continue their efforts to earn the Master Outreach Award. This will require the member to earn the first two awards, followed by 100 additional hours of outreach events. The Master Outreach Award also requires the member to write a report on what seems to work best for their outreach efforts.

The reports written for both the Stellar and Master Outreach Awards may be selected for future issues of *The Reflector*, the quarterly magazine of the Astronomical League.

If you are interested in earning any of these outreach awards, you can learn more about them at the Astronomical League's web site at <http://www.astroleague.org/al/obsclubs/outreach/outreach.html>.



The Astronomical League's Outreach Award pin.
Image courtesy of the Astronomical League.

If you decide to try for any of these awards, you may wish to compile a list of the outreach events you have participated in since 2006. (Events logged prior to 2006 are not eligible.) The information you will need will be dates, times, locations, what you did for the events, and an estimate of the number of people attending the events. Visit the web page above for all the details, and then send your outreach records and reports to our League Coordinator, Rich Dietz, at tmeeki@madisontelco.com.

RBAC



A Cosmic Tease: Trials of the Herschel Space Telescope Science Teams

By Dr. Marc J. Kuchner

Vast fields of marble-sized chunks of ice and rock spun slowly in the darkness this week, and I sat in the back of a grey conference room with white plastic tables spread with papers and laptops. I was sitting in on a meeting of an international team of astronomers gathered to analyze data from the Herschel Infrared Observatory. This telescope, sometimes just called Herschel, orbits the Sun about a million miles from the Earth.

The meeting began with dinner at Karl's house. Karl charred chorizo on the backyard grill while the airplanes dribbled into Dulles airport. Our colleagues arrived, jetlagged and yawning, from Germany, Sweden, and Spain, and we sat on Karl's couches catching up on the latest gossip. The unemployment level in Spain is about twenty percent, so research funding there is hard to come by these days. That's not nice to hear. But it cheered us up to be with old friends.

The meeting commenced the next morning, as the vast fields of ice and rock continued to spin—shards glinting in the starlight. Or maybe they didn't. Maybe they didn't exist at all.

You see, this team is looking at a series of images of stars taken by a device called a bolometer that is blind to ordinary starlight. Instead, the bolometer inside Herschel senses infrared light, a kind of light that we would probably refer to as heat if we could feel it. But the idea of pointing the bolometer at the stars was not to collect ordinary starlight. It was to measure heat coming from the vicinity of these stars, like an infrared security camera, in case there was something else to be found lurking nearby.

And lo and behold, for a handful of stars, the bolometer measurements were off the charts! Maybe something was orbiting these stars. From the details of the bolometer readings—which channels lit up and

so on—you would guess that this stuff took the form of majestic fields or rings of icy and rocky particles. It would be a new kind of disk, a discovery worth writing home to Madrid about.

There are several teams of astronomers analyzing data from the Herschel Space Telescope. They call themselves by oddly inappropriate sounding acronyms: GASPS, DUNES, DEBRIS. For the time being, the scientists on these teams are the only ones with access to the Herschel data. But in January, all the data these teams are working on will suddenly be released to the public. So they are all under pressure to finish their work by then. The team whose meeting I was sitting in on would like to publish a paper about the new disks by then.

But it's not so simple. The stars that this team had measured were relatively nearby as stars go, less than a few hundred light years. But the universe is big, and full of galaxies of all kinds—a sea of galaxies starting from maybe a hundred thousand light years away, and stretching on and on. Maybe one of those background galaxies was lined up with each of the stars that had lit up the bolometer—fooling us into thinking they were seeing disks around these stars.

The team argued and paced, and then broke for lunch. We marched to the cafeteria through the rain. Meanwhile, vast fields of marble-sized chunks of ice and rock spun slowly in the darkness. Or maybe they didn't.

What else did Herschel recently uncover? Find out at <http://spaceplace.nasa.gov/comet-ocean>.



Samuel Pierpoint Langley, who developed the bolometer in 1878. His instrument detects a broad range of infrared wavelengths, sensitive to differences in temperature of one hundred-thousandth of a degree Celsius (0.00001 C). In

1961, Frank Low developed the germanium bolometer, which is hundreds of times more sensitive than previous detectors and capable of detecting far-infrared radiation.

Dr. Marc J. Kuchner is an astrophysicist at the Exoplanets and Stellar Astrophysics Laboratory at NASA's Goddard Space Flight Center. NASA's Astrophysics Division works on big questions about the origin and evolution of the universe, galaxies, and planetary systems. Explore more at <http://www.science.nasa.gov/astrophysics/>. Kids can explore these topics at <http://spaceplace.nasa.gov/space>.

RBAC's Monthly Observing Lists

These lists include brighter deep-sky objects that transit near 10:00 PM each month.



November Observing List

Prepared by Bill Breeden

Double Stars (Astronomical League's Double Star List)

- _____ 1. Eta Cassiopeiae SAO 21732 Achird Const. CAS Type DS RA 00 49.1 Decl. +57° 49' Mag. 3.4 7.5
- _____ 2. 65 Piscium SAO 74295 Const. PSC Type DS RA 00 49.9 Decl. +27° 43' Mag. 6.3 6.3
- _____ 3. Psi 1 Piscium SAO 74482 Const. PSC Type DS RA 01 05.6 Decl. +21° 28' Mag. 5.6 5.8
- _____ 4. Zeta Piscium SAO 109739 Const. PSC Type DS RA 01 13.7 Decl. +07° 35' Mag. 5.6 6.5
- _____ 5. Gamma Arietis SAO 92680 Mesarthim Const. ARI Type DS RA 01 53.5 Decl. +19° 18' Mag. 4.8 4.8
- _____ 6. Lambda Arietis SAO 75051 Const. ARI Type DS RA 01 57.9 Decl. +23° 36' Mag. 4.9 7.7

Carbon Stars (Astronomical League's Carbon Star List)

- _____ 1. WZ Cassiopeiae SAO 21002 RA 00 01 15 Decl. +60 21 19 Mag. 6.9 – 11.0 Per. 186 Class C9 (N1)
- _____ 2. SU Andromedae GSC 2793:243 RA 00 04 36 Decl. +43 33 04 Mag. 8.0 – 8.5 Per. Irr. Class C6 (Nb)
- _____ 3. SAO 109003 (Pisces) GSC 594:778 RA 00 05 22 Decl. +08 47 16 Mag. 8.2 – 8.3 Per. ? Class C (G4V)
- _____ 4. VX Andromedae GSC 2794:14 RA 00 19 54 Decl. +44 42 33 Mag. 7.8 – 9.3 Per. 369 Class C4 (N7)
- _____ 5. AQ Andromedae GSC 2270:318 RA 00 27 31 Decl. +35 35 14 Mag. 6.9 – 8.6 Per. 346 Class C5 (Nb)
- _____ 6. NSV 15196 (Andromeda) SAO 74353 RA 00 54 13 Decl. +24 04 01 Mag. 8.3–8.7 Per. 755 Class C1 (Rp)
- _____ 7. W Cassiopeiae GSC 368:1824 RA 00 54 53 Decl. +58 33 49 Mag. 7.8 – 12.5 Per. 406 Class C7
- _____ 8. Z Piscium SAO 74593 RA 01 16 05 Decl. +25 46 09 Mag. 6.5 – 7.9 Per. 144 Class C7 (N0)

Messier Objects

- _____ M31 NGC224 Andromeda Galaxy Const. AND Type GAL RA 00 42.7 Decl. +41 16 Mag. 4.8
- _____ M32 NGC221 Companion of And Galaxy Const. AND Type GAL RA 00 42.7 Decl. +40 52 Mag. 8.7
- _____ M33 NGC598 Const. TRI Type GAL RA 01 33.9 Decl. +30 39 Mag. 6.7
- _____ M74 NGC628 Const. PSC Type GAL RA 01 36.7 Decl. +15 47 Mag. 10.2
- _____ M76 NGC650 Little Dumbbell Nebula Const. PER Type PN RA 01 42.4 Decl. +51 34 Mag. 10.1
- _____ M103 NGC581 Const. CAS Type OC RA 01 33.2 Decl. +60 42 Mag. 7.4
- _____ M110 NGC205 Const. AND Type GAL RA 00 40.4 Decl. +41 41 Mag. 9.4

Caldwell Objects

- _____ C1 NGC188 Const. CEP Type OC RA 00 44 24.00 Decl. +85 20 00.0 Mag. 8.1
- _____ C2 NGC40 Const. CEP Type PN RA 00 13 00.00 Decl. +72 32 00.0 Mag. 11.6
- _____ C8 NGC559 Const. CAS Type OC RA 01 29 30.00 Decl. +63 18 00.0 Mag. 9.5
- _____ C10 NGC663 Const. CAS Type OC RA 01 46 00.00 Decl. +61 15 00.0 Mag. 7.1
- _____ C13 NGC457 ET Cluster Const. CAS Type OC RA 01 19 06.00 Decl. +58 20 00.0 Mag. 6.4
- _____ C17 NGC147 Const. CAS Type EG RA 00 33 12.00 Decl. +48 30 00.0 Mag. 9.3
- _____ C18 NGC185 Const. CAS Type EG RA 00 39 00.00 Decl. +48 20 00.0 Mag. 9.2
- _____ C28 NGC752 Const. AND Type OC RA 01 57 48.00 Decl. +37 41 00.0 Mag. 5.7
- _____ C43 NGC7814 Const. PEG Type SG RA 00 03 18.00 Decl. +16 09 00.0 Mag. 10.5
- _____ C51 IC1613 Const. CET Type IG RA 01 04 48.00 Decl. +02 07 00.0 Mag. 9
- _____ C56 NGC246 Const. CET Type PN RA 00 47 00.00 Decl. -11 53 00.0 Mag. 8
- _____ C62 NGC247 Const. CET Type SG RA 00 47 06.00 Decl. -20 46 00.0 Mag. 8.9
- _____ C65 NGC253 Sculptor Galaxy Const. SCL Type SG RA 00 47 36.00 Decl. -25 17 00.0 Mag. 7.1
- _____ C70 NGC300 Const. SCL Type SG RA 00 54 54.00 Decl. -37 41 00.0 Mag. 8.1
- _____ C72 NGC55 Const. SCL Type SG RA 00 14 54.00 Decl. -39 11 00.0 Mag. 8.2
- _____ C104 NGC362 Const. TUC Type GC RA 01 03 12.00 Decl. -70 51 00.0 Mag. 6.6

_____ C106 NGC104 47 Tucana Const. TUC Type GC RA 00 24 06.00 Decl. -72 05 00.0 Mag. 4

Royal Astronomical Society of Canada Objects

_____ 6. NGC185 Const. CAS Type G-E0 RA 00 39.0 Decl. +48 20 Mag. 11.7

_____ 7. NGC281 Const. CAS Type EN RA 00 52.8 Decl. +56 36 Mag. -

_____ 8. NGC457 ET Cluster Const. CAS Type OC RA 01 19.1 Decl. +58 20 Mag. 6.4

_____ 9. NGC663 Const. CAS Type OC RA 01 46.0 Decl. +61 15 Mag. 7.1

_____ 13. NGC253 Const. SCL Type G-Scp RA 00 47.6 Decl. -25 17 Mag. 7.1

_____ 14. NGC772 Const. ARI Type G-Sb RA 01 59.3 Decl. +19 01 Mag. 10.3

_____ 15. NGC246 Const. CET Type PN RA 00 47.0 Decl. -11 53 Mag. 8

_____ 110. NGC40 Const. CEP Type PN RA 00 13.0 Decl. +72 32 Mag. 10.2



December Observing List

Prepared by Bill Breeden

Double Stars (Astronomical League's Double Star List)

- _____ 7. Alpha Piscium SAO 110291 Al Rischa Const. PSC Type DS RA 02 02.0 Decl. +02° 46' Mag. 4.2 5.1
 - _____ 8. Gamma Andromedae SAO 37734 Almach Const. AND Type DS RA 02 03.9 Decl. +42° 20' Mag. 2.3
 - _____ 9. Iota Trianguli SAO 55347 Const. TRI Type DS RA 02 12.4 Decl. +30° 18' Mag. 5.3 6.9
 - _____ 10. Alpha Ursae Minoris SAO 15384 Polaris Const. UMI Type DS RA 02 31.8 Decl. +89° 16' Mag. 2.0 9.0
 - _____ 11. Gamma Ceti SAO 110707 Kaffaljidhma Const. CET Type DS RA 02 43.3 Decl. +03° 14' Mag. 3.5 7.3
 - _____ 12. Eta Persei SAO 23655 Miram Const. PER Type DS RA 02 50.7 Decl. +55° 54' Mag. 3.8 8.5
- 5.5
- _____ 13. Struve 331 SAO 23763 Const. Type DS RA 03 00.9 Decl. +52° 21' Mag. 5.3 6.7
 - _____ 14. 32 Eridani SAO 130805 Const. ERI Type DS RA 03 54.3 Decl. -02° 57' Mag. 4.8 6.1

Carbon Stars (Astronomical League's Carbon Star List)

- _____ 9. V Arietis SAO 92853 RA 02 15 00 Decl. +12 14 23 Mag. 8.3 – 10.8 Per. 77 Class C4 (R8)
- _____ 10. SAO 129989 (Cetus) GSC 5285:3 RA 02 35 06 Decl. -09 26 34 Mag. 8.2 – 8.5 Per. ? Class C2 (R3)
- _____ 11. UY Andromedae GSC 2832:2 RA 02 38 23 Decl. +39 10 09 Mag. 7.4 – 12.3 Per. ? Class C5 (N3)
- _____ 12. V623 Cassiopeiae SAO 23858 RA 03 11 25 Decl. +57 54 11 Mag. 7.3 – 8.1 Per. ? Class C4 (R5)
- _____ 13. Y Persei GSC 2873:1287 RA 03 27 42 Decl. +44 10 36 Mag. 8.1 – 11.3 Per. 249 Class C4 (R4)
- _____ 14. V466 Persei NSV 1223 RA 03 41 29 Decl. +51 30 11 Mag. 8.4 – 8.9 Per. ? Class C5 (N5)
- _____ 15. U Camelopardalis SAO 12870 RA 03 41 48 Decl. +62 38 54 Mag. 6.9 – 7.6 Per. ? Class C3 – C6 (N5)

Messier Objects

- _____ M34 NGC1039 Const. PER Type OC RA 02 42.0 Decl. +42 47 Mag. 5.5
- _____ M45 Pleiades Const. TAU Type OC RA 03 47.0 Decl. +24 07 Mag. 1.6
- _____ M77 NGC1068 Const. CET Type GAL RA 02 42.7 Decl. -00 01 Mag. 8.9

Caldwell Objects

- _____ C5 IC342 Const. CAM Type SG RA 03 46 48.00 Decl. +68 06 00.0 Mag. 9.2
- _____ C14 NGC869/884 Double Cluster Const. PER Type OC RA 02 20 00.00 Decl. +57 08 00.0 Mag. 4.3
- _____ C23 NGC891 Const. AND Type SG RA 02 22 36.00 Decl. +42 21 00.0 Mag. 9.9
- _____ C24 NGC1275 Per A Radio Source Const. PER Type IG RA 03 19 48.00 Decl. +41 31 00.0 Mag. 11.6
- _____ C67 NGC1097 Const. FOR Type SG RA 02 46 18.00 Decl. -30 17 00.0 Mag. 9.2
- _____ C87 NGC1261 Const. HOR Type GC RA 03 12 18.00 Decl. -55 13 00.0 Mag. 8.4

Royal Astronomical Society of Canada Objects

- _____ 10. IC 289 Const. CAS Type PN RA 03 10.3 Decl. +61 19 Mag. 12.3
- _____ 12. NGC891 Const. AND Type G-Sb RA 02 22.6 Decl. +42 21 Mag. 10
- _____ 16. NGC936 Const. CET Type G-SBa RA 02 27.6 Decl. -01 09 Mag. 10.1
- _____ 17. NGC869/884 Double Cluster Const. PER Type OC RA 02 20.0 Decl. +57 08 Mag. ~4.4
- _____ 18. NGC1023 Const. PER Type G-E7p RA 02 40.4 Decl. +39 04 Mag. 9.5
- _____ 21. NGC1232 Const. ERI Type G-Sc RA 03 09.8 Decl. -20 35 Mag. 9.9