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The heavyweight champion of the Cosmos

By Dr. Ethan Siegel

As crazy as it once seemed, we once assumed that the Earth was the largest thing in all the universe. 2,500 years ago, the Greek philosopher Anaxagoras was ridiculed for suggesting that the Sun might be even larger than the Peloponnesus peninsula, about 16% of modern-day Greece. Today, we know that planets are dwarfed by stars, which themselves are bound together by the billions or even trillions into galaxies.

But gravitationally bound structures extend far beyond galaxies, which themselves can bind together into massive clusters across the cosmos. While dark energy may be driving most galaxy clusters apart from one another, preventing our local group from falling into the Virgo Cluster, for example, on occasion, huge galaxy clusters can merge, forming the largest gravitationally bound structures in the universe.

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President's Article

By Tim Campbell

Opportunities Abound

March is shaping up to be a busy month with several activities planned even before the spring observing season begins.

On Friday, March 6 we've been invited to have a table (and if clear, a few telescopes) for a fund-raiser event in Novi. Recall that a few weeks ago Liam Finn had a table for a community space-themed dance event in Novi. At that event, Liam was asked if the club could have a similar table for this fund-raiser in March. The fund-raiser's goal is to raise money to build housing for poor people in India. This is an evening event. We are looking for one or two people who could help support a table at this event with Liam.

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STAR STUFF

February 2015 - Vol. 25 No 2

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FORD AMATEUR ASTRONOMY CLUB
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Club Information:

The Ford Amateur Astronomy Club (FAAC) meets on the fourth Thursday each month, except for the combined November/December meeting on the first Thursday of December - at Henry Ford College Administration Services and Conference Center in Dearborn. Refer to our website for a map and directions (www.fordastronomyclub.com).

The FAAC observes at Spring Mill Pond within the Island Lake State Recreation Area near Brighton, Michigan. The club maintains an after-hours permit, and observes on Friday and Saturday nights, and nights before holidays, weather permitting. The FAAC also has use a private observing site near Gregory Michigan and Lake Erie Metro Park. See the FAAC Yahoo Group* for more information.

Observing schedules and additional info are available on our website, or via the FAAC Yahoo Group.* Or call the FAAC Hotline, for info and leave a message, or ask questions: 313-757-2582. or send email inquiries to info@fordastronomyclub.com.

Membership in the FAAC is open to anyone with an interest in amateur astronomy. The FAAC is an affiliate of the Ford Employees Recreation Association (F.E.R.A.). Membership fees:

Annual - New Members: \$30 (\$15 after July 1)
Annual - Renewal: \$25 (\$30 after January 31)

Membership includes the STAR STUFF newsletter, discounts on magazines, discounts at selected area equipment retailers, and after-hours access to the Island Lake observing site.

Astronomy or Sky & Telescope Magazine Discounts

Obtain the required form from the FAAC club treasurer for a \$10 discount. Send the completed form directly to the respective publisher with your subscriptions request and payment. Do not send any money directly to the FAAC for this.

Star Stuff Newsletter Submissions

Your submissions to STAR STUFF are welcome! Send your story and/or images to the editor: StarStuff@fordastronomyclub.com. Email text or MS Word is fine. STAR STUFF will usually go to press the weekend prior to each general meeting. Submissions received prior to the 15th can be included in that issue.

* FAAC Members are welcome to join our Ford Astronomy Club Yahoo!Group. Messages photos, files, online discussions, and

This month's background photos of the moon Page 1 courtesy of John Kirchhoff. See more of John's photos at:

<http://www.flickr.com/photos/33926475@N06/with/4311533997/>

March 11-15 (Weds through Sunday) is Michigan Science Center's Astronomy Week. They've asked if we can have a table and telescopes for public viewing. This is a daytime event each day (only during Science Center operating hours.) We are looking for volunteers for this. A volunteer does not need to be there every day, but if you can make some of the days, your participation would be appreciated. Please note that the 14th is also the same day as the club Conference & Swap Meet.

March 14 (Saturday) is the annual Ford Amateur Astronomy Club Conference & Swap Meet. In past years, more emphasis has been on the swap meet. This year Jim Frisbie has put substantial efforts into bringing in more speakers with higher level content and de-emphasizing the astronomy 101 level talks and exhibits. He has also invited several regional astronomy vendors to participate. We do need volunteers to help out with the event and will provide details at the club meeting.

March 20 (Friday) Kevin Reina is organizing an Astronomy Day for Frost Middle School in Livonia. This would be an all-day event. More updates to follow on this, so please watch the Ford Astronomy Club Yahoo group for details via email.

Looking forward, don't forget to reserve April 25, and May 2 on your calendars. April 25 is International Astronomy Day (daytime solar outreach at Kensington Metropark and Michigan Science Center and our first beginner's night of the year with public outreach at Lake Erie Metropark). May 2nd is the Annual Club Banquet — watch for details on this in the near future.

Now if someone would please get rid of all this snow, cold weather, and clouds, we'd all be especially grateful.



Image credit: NASA, ESA, J. Jee (UC Davis), J. Hughes (Rutgers U.), F. Menanteau (Rutgers U. and UIUC), C. Sifon (Leiden Observatory), R. Mandelbaum (Carnegie Mellon U.), L. Barrientos (Universidad Catolica de Chile), and K. Ng (UC Davis). X-rays are shown in pink from Chandra; the overall matter density is shown in blue, from lensing derived from the Hubble space telescope. 10 billion light-years distant, El Gordo is the most massive galaxy cluster ever found.

The heavyweight champion of the Cosmos

Take the "El Gordo" galaxy cluster, catalogued as ACT-CL J0102-4915. It's the largest known galaxy cluster in the distant universe. A galaxy like the Milky Way might contain a few hundred billion stars and up to just over a trillion (10^{12}) solar masses worth of matter, the El Gordo cluster has an estimated mass of 3×10^{15} solar masses, or 3,000 times as much as our own galaxy! The way we've figured this out is fascinating. By seeing how the shapes of background galaxies are distorted into more elliptical-than-average shapes along a particular set of axes, we can reconstruct how much mass is present in the cluster: a phenomenon known as weak gravitational lensing.

That reconstruction is shown in blue, but doesn't match up with where the X-rays are, which are shown in pink! This is because, when galaxy clusters collide, the neutral gas inside heats up to emit X-rays, but the individual galaxies (mostly) and dark matter (completely) pass through one another, resulting in a displacement of the cluster's mass from its center. This has been observed before in objects like the Bullet Cluster, but El Gordo is much younger and farther away. At 10 billion light-years

distant, the light reaching us now was emitted more than 7 billion years ago, when the universe was less than half its present age.

It's a good thing, too, because about 6 billion years ago, the universe began accelerating, meaning that El Gordo just might be the largest cosmic heavyweight of all. There's still more universe left to explore, but for right now, this is the heavyweight champion of the distant universe!

Learn more about "El Gordo" here: <http://www.nasa.gov/press/2014/april/nasa-hubble-team-finds-monster-el-gordo-galaxy-cluster-bigger-than-thought/>

El Gordo is certainly huge, but what about really tiny galaxies? Kids can learn about satellite galaxies at NASA's Space Place <http://spaceplace.nasa.gov/satellite-galaxies/>.

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

FAAC General Meeting Minutes January 22nd, 2015

By Ellen Duncan

Opening:

Tim Campbell called the meeting to order at 5:31 p.m. People introduced themselves; there were two new members. Tim explained about the club's mentor program.

Observation Experiences:

Milt French looked for all 8 planets on New Year's Eve, saw all 8 over the night either naked eye or binoculars. 7 people saw comet Lovejoy since the last meeting. Ken Anderson observed the comet and other objects with binoculars and scopes. Bob Trembley's wife saw Mercury for the first time. Instead of the usual "What's Up in February," Tim explained the upcoming Jupiter's Triple-shadow Transit the night of January 23-24 (approx. 10 p.m. to 6 a.m., best views very early January 24).

Main Presentation:

Bob Trembley from the Warren Astronomical Society gave the main talk called "Asteroids, Near Earth Objects, and Meteorites." In it he explained the origins and characteristics of asteroids, meteoroids, comets, bolides, and other objects that approach or impact the earth and other bodies in our solar system.

Business Meeting:

- Gordon Hansen gave the Treasurer's Report, also printed in the January Star Stuff.
- FAAC Board officers were elected for the upcoming year. Tim Campbell was re-elected as President, Tim Dey was elected as Vice President, Gordon Hansen was re-elected as Treasurer, and Ellen Duncan re-elected as Secretary.

Projects and Events:

- January 23-24 Triple-shadow transit of Jupiter
- January 24 "Dance Project" outreach for Middle- and High-School age students with a space theme (Weather Permitting--see www.thedanceproject.info for location and information)
- February 12 Astrophotography SIG meeting
- March 14 FAAC Astronomy Conference (formerly FAAC Astronomy Expo and Swap Meet) at Holy Cross Lutheran Church, 9 am-3pm
- April 25 First Beginners' Night for 2015
- May 2 Annual FAAC Banquet

Announcements:

Sirius Award Nominations: Please send nominations to Tim Campbell--the person's name and reasons why the person deserves the award for the being "the brightest star" in the club. Deadline for nominations is January 31.

Tim Dey announced that a few permits are left for club members for Lake Erie Metropark observing after hours. Please contact him if you would like a permit, or for an explanation of the rules.

George Korody announced that another telescope was donated to the club, and that the first AATB planning meeting would be Sunday, Feb 8, 1 pm, at the nature center at Kensington Metropark.

The meeting was adjourned at 7:45 p.m.

Treasurer's Report February 16, 2015

By Gordon Hansen

ASSETS

	Feb 16, 15
Current Assets	
Checking/Savings	
10000 · Checking	143.36
11000 · FAAC Savings	
11100 · FAAC Club Savings	2,018.87
11200 · Equipment	1,913.49
11300 · Scholarship	375.26
11400 · GLAAC	5,266.18
Total 11000 · FAAC Savings	9,573.80
12000 · Petty Cash Account	91.56
13000 · CD's	
13100 · CD 200599272	1,061.08
13200 · CD 205196033	1,005.82
13300 · CD 89265268	1,109.04
Total 13000 · CD's	3,175.94
Total Checking/Savings	12,984.66
Total Current Assets	12,984.66
TOTAL ASSETS	12,984.66

Meeting Agenda - February 26th

HFC – Berry Auditorium -Admin. Services & Conference Center www.fordastronomyclub.com
5:30

Opening/Introduction/Member Observing

Main Presentation:

Astrophoto Images by Astrophotography SIG
Gordon Hansen

Tech Talk:

Meade DSI Imaging Camera Gordon Hansen

Club Projects/Committees/Member Support

Club Business/Secretary/Treasurer/Equipment Reports

FAAC Equip Report 2/14/15

By Dennis Salliotte

Item	Currently Held By:	Date Last Verified
Telescopes		
4" Dobsonian	George Korody	1/22/15
Presentation Tools		
Projector (older)	Jim Frisbie	1/6/15
Projection Screen 8'	Bob MacFarland	1/11/15
Speaker System w/wireless mic	Bob MacFarland	1/11/15
Bullhorn	George Korody	1/22/15
DVD Player	Jim Frisbie	1/6/15
Projection Screen 6'	Gordon Hansen	2/13/15
Projector, ViewSonic	Gordon Hansen	2/13/15
Demonstration Tools	Currently Held By:	Date Last Verified
Weight On Planets Scale	George Korody	1/22/15
Lunar Phase Kit	Bob MacFarland	1/11/15
100 ft Scale Model Solar System Kit	Bob MacFarland	1/11/15

Astro Imaging SIG

Gordon Hansen

All are invited to join us in the Astro Imaging SIG meetings, to share and discuss images, experiences, and techniques.

We always have a good time, with lively discussion, and sharing of valuable information.

Next meeting is **March 12th**. The meeting room location – HFCC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.

Topics invited. Pizza served.

FAAC Events 2015

February 26th - General Club meeting

March 12th - Astro Imaging SIG meeting

**March 14th - FAAC Astronomy Conference
(formerly FAAC Astronomy Expo
and Swap Meet) at Holy Cross
Lutheran Church, 9 am-3pm**

April 25th - Beginners Night

May 2nd - Annual FAAC Banquet

*Background Photo from Lunt Solar Scope Image taken at the
Hector J Robinson Observatory, June 28, 2010*

One FAAC members blog

<http://hjrobservatory.blogspot.com/>

A few updates on the observatory, quick articles and photos. I'll try to improve my writing on this blog. Also, I try to keep daily updates on this blog. - Greg Knekleian, HJRO volunteer.

Display Items		
Astronomy Event Sign (3' X 6')	Gordon Hansen	2/13/15
PVC Display Board - Folding	Tim Campbell	1/22/15
Banner – Large (32" X 16')	Dennis Salliotte	2/14/15
Banner – Medium (24" X 72")	Tim Campbell	1/22/15
Banner – Small (24" X 32")	George Korody	1/22/15
Tri-Fold Presentation Boards	Don Klaser	1/22/15
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/22/15
Other		
Canopy (10' X 10')	Tim Campbell	1/22/15
Equipment Etching Tool	Gordon Hansen	2/13/15
Pop Cooler	Michael Dolsen	1/22/15
Equipment Kits	Caretaker	
Telescopes		
TK3 Celstrn 130 Newt Goto mount	Liam Finn	2/13/15
TK4 Clstrn 90 Refrctr w/man mount	Liam Finn	2/13/15
TK5 4 1/2 " Reflector, on Fitz GEM mount	George Korody	1/22/15
TK6 8" Orion 8XTi Dobsonian	Patrick Lawton	2/13/15
Binoculars		
BK3 15x70 binocs, monopod mount	Bob MacFarland	1/11/15
BK4 20x80 binocs, altaz goto mount	Sandra Macika	2/5/15
BK5 25x70 binocs w/tripod adaptor	Tim Dey	2/13/15
Eyepiece Kit		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/13/15
Other		
TA Sky Quality Meter	Syed Saifullah	2/14/15
TA Sky Atlas 2000.0	Tim Dey	2/13/15
TA Orion telescope binoviewer	Liam Finn	2/13/15

FAAC Equip Report 2/14/15

By Dennis Salliotte

Lincoln Park Observatory		
LPO Celestron binoviewer #93691	Tim Dey	2/13/15
LPO Celestron 2X 1.25" Barlow	Tim Dey	2/13/15
Imaging SIG		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	2/13/15
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	2/13/15
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	2/13/15
C4 Meade Electronic Eyepiece w/cable to a video monitor, VCR or TV. Pairw#43 AND Meade 3.5" LCD Color Monitor Kit # 07700 Complete (unused). Pair w#34	Gordon Hansen	2/13/15
C5 Orion StarShoot Deep Space Video Camera II #52195 AND Orion StarShoot iPhone Control for Deep Space Video Camera II #52195	Gordon Hansen	2/13/15
CA1 Rigel Systems Spectroscope	Gordon Hansen	2/13/15
CA2 Celestron 1.25" to T-Adapter(male thread) Model #93625	Gordon Hansen	2/13/15
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter ans variable 1.25" extender	Gordon Hansen	2/13/15
CA4 Orion StarShoot LCD-DVR #58125 2.5" LCD screen	Gordon Hansen	2/13/15
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	2/13/15
Special Event Use Only- Not Available For Loan Out		
TK1 Coronado PST solar scope w/double stack, Meade Autostar Goto mount & tripod and accessories	John McGill	1/22/15
TK2 Meade 8" ETX-LS-ACF w/tripod, voice assist, computerized GPS plus MANY (35+) accessories	Tim Dey	2/13/15
BK1 Orion BT-100 binocular telescope w/hard case, Orion VersaGo h.d. man altaz mount w/Vixen dovetail head and Vixen style binocular holder bracket	Ken Anderson	1/11/15
BK2 Zhumell 25x100 binoculars, hard case & Zhumell TRH-16 tripod w/soft fabric bag	Sandra Macika	2/5/15
TAK1 Night Vision Intensification binocular unit	George Korody	1/22/15

Ford Amateur Astronomy Club
Star Stuff Newsletter
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