



# STAR STUFF

The Newsletter of the Ford Amateur Astronomy Club

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June 2015

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## No Surprise! Earth's Strongest Gravity Lies Atop The Highest Mountains

By Ethan Siegel

Put more mass beneath your feet and feel the downward acceleration due to gravity increase. Newton's law of universal gravitation may have been superseded by Einstein's, but it still describes the gravitational force and acceleration here on Earth to remarkable precision. The acceleration you experience is directly proportional to the amount of mass you "see," but inversely proportional to the distance from you to that mass squared.

The denser the mass beneath your feet, the stronger the gravitational force, and when you are closer to such a mass, the force is even greater. At higher elevations or even higher altitudes, you'd expect your gravitational force to drop as you move farther from Earth's center.

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## President's Article

By Tim Campbell

### School Outreach & Club Solar Scope

#### Northville Outreach

Liam Finn invited faculty, students, and parents from Amerman Elementary School in Northville to the Novi ITC Sports Park for an outreach under the stars on Saturday, June 6. Liam used one of the NASA Night Sky Network kits to provide a presentation on the solar system and distances between the planets (this is the first time we've formally used the kit.) The presentation was received very well. After the presentation, students used the telescopes.

It's always enjoyable to hear the reaction from guests, who noticed that (a) Venus has "phases" like the moon, (b) Jupiter has dark bands on its surface — along with the four bright Galilean moons, and (c) Saturn has rings!

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# STAR STUFF

## June 2015 - Vol. 25 No 6

STAR STUFF is published eleven times each year by:

**FORD AMATEUR ASTRONOMY CLUB**  
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SECRETARY: Ellen Duncan  
TREASURER: Gordon Hansen  
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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](http://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](mailto: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](mailto: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/>

These are always exciting — especially for first-time viewers. It's fortunate that we happen to have three bright planets visible at the same time.

We also looked at several deep space objects once it was dark enough. These included the Hercules (Globular) Cluster (M13), the Dumbbell Nebula (M27), the Ring Nebula (M57), several galaxies including Bode's Galaxy (M81), the Cigar Galaxy (M82), and the Whirlpool Galaxy (M51). We had the benefit of the club night-vision viewer (donated by Maria) to make many of these observations much easier.

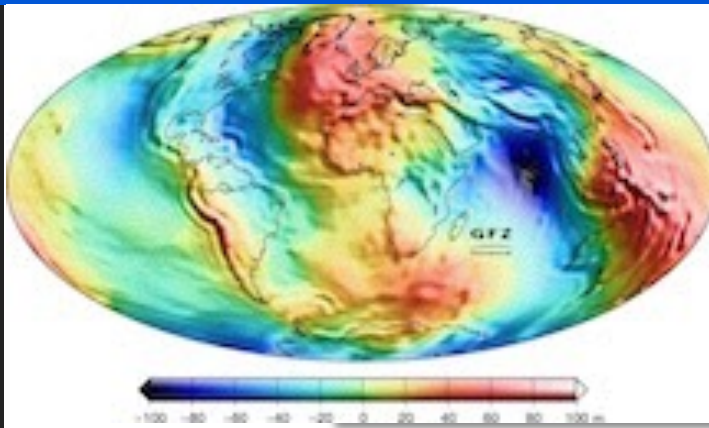
The school reported that 60 guests were in attendance for this event.



## Solar Scope

The club owns a Coronado Personal Solar Telescope (PST) which was part of the equipment donated by Maria. The PST is a "double stack" Hydrogen alpha (Ha) solar telescope. All Ha solar telescopes have at least one tuning etalon, but a "double stack" has an optional second etalon tuning module which allows for a narrower bandpass that can reveal more surface contrast and detail.

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*Image credit: NASA / GRACE mission / Christoph Reigber, et al. (2005): An Earth gravity field model complete to degree and order 150 from GRACE: EIGEN-GRACE02S, Journal of Geodynamics 39(1),1–10. Reds indicate greater gravitational anomalies; blues are smaller ones.*

## No Surprise! Earth's Strongest Gravity Lies Atop The Highest Mountains

*(continued from Page 1)*

You'd probably also expect that downward acceleration to be greater if you stood atop a large mountain than if you flew tens of thousands of feet above a flat ocean, with nothing but ultra-light air and liquid water beneath you for all those miles. In fact this is true, but not just due to the mountain's extra mass!

Earth is built like a layer-cake, with the less dense atmosphere, ocean, and crust floating atop the denser mantle, which in turn floats atop the outer and inner cores of our planet. An iceberg's buoyancy is enough to lift only about one tenth of it above the sea, with the other nine tenths below the surface. Similarly, each and every mountain range has a corresponding "invisible mountain" that dips deep into the mantle. Beneath the ocean floor, Earth's crust might be only three to six miles thick, but it can exceed 40 miles in thickness around major mountain ranges like the Himalayas and the Andes. It's where one of Earth's tectonic plates subducts beneath another that we see the largest gravitational anomalies: another confirmation of the theory of continental drift.

A combination of instruments aboard NASA's Gravity Recovery and Climate Experiment (GRACE) satellites, including the SuperSTAR accelerometer, the K-band ranging system and the onboard GPS receiver, have enabled the construction of the most accurate map of Earth's gravitational field ever: to accelerations of nanometers per second squared. While the mountaintops may be farther from Earth's center than any other point, the extra mass of the mountains and their roots – minus the mass of the displaced mantle – accounts for the true gravitational accelerations we actually see. It's only by the grace of these satellites that we can measure this to such accuracy and confirm what was first conjectured in the 1800s: that the full layer-cake structure of Earth must be accounted for to explain the gravity we experience on our world!

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



## Treasurer's Report

June 12, 2015

By Gordon Hansen

Jun 12, 15

### ASSETS

#### Current Assets

##### Checking/Savings

10000 · Checking 506.02

##### 11000 · FAAC Savings

11100 · FAAC Club Savings 1,789.68

11200 · Equipment 1,984.70

11300 · Scholarship 165.26

11400 · GLAAC 6,166.18

Total 11000 · FAAC Savings 10,105.82

12000 · Petty Cash Account 233.63

##### 13000 · CD's

13100 · CD 200599272 1,061.61

13200 · CD 205196033 1,006.32

13300 · CD 89265268 1,109.73

Total 13000 · CD's 3,177.66

Total Checking/Savings 14,023.13

Total Current Assets 14,023.13

TOTAL ASSETS 14,023.13

## Meeting Agenda - June 25th

HFC – Berry Auditorium -Admin. Services & Conference Center [www.fordastronomyclub.com](http://www.fordastronomyclub.com)  
5:30

### Opening/Introduction/Member Observing

#### Main Presentation:

The Music of Spheres Ellen Duncan

#### Tech Talk:

Beginning Video Astronomy Syed Saifullah

### Club Projects/Committees/Member Support

### Club Business/Secretary/Treasurer/Equipment Reports

## President's Article

(continued from Page 2)

The device was originally classified as a "special events" item (not available for borrowing), but has been reclassified and is now available to club members. The scope is part of a kit which includes a Meade DS 2000 series mount — a goto mount with a Meade Autostar. The equipment committee originally felt that the complexity of learning to setup, align, and use the goto mount might put it in category requiring more expertise than equipment such as the club's dob or binoculars, etc. which have no motors.

Upon further consideration, there is actually no reason why the scope has to be used on the DS mount. It's small and easily portable. It has a standard mounting hole (1/4"-20) used by photographic tripods and can be mounted on a camera tripod if someone did not want to use the electronics. The Meade Autostar is common to most Meade goto scopes, so if you've ever used another Meade goto scope then you're probably already familiar with the system.

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## 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 **July 9th**. The meeting room location – HFCC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.

Topics invited. Pizza served.

## FAAC Events 2015

**June 25th - General Meeting at HFC**

**July 9th - Astro Imaging SIG Meeting at HFC**

**July 23rd - General Meeting at HFC**

**July 25th - Beginner's Night at Island Lake**

**August 22nd - Beginner's Night at Island Lake**

*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.

## President's Article

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The Autostar would normally need a star alignment which, of course, cannot be done during the daytime. You can approximate an alignment by starting with a level tripod, point the telescope to "true" north, and level the optical tube of the telescope to the horizon. This is the "home" position. When powering on the mount, verify the date & time are accurate (the scope has a clock-battery built into the mount so you may not need to adjust the time.)

Meade doesn't have the "Sun" in it's object database, but we've added it. The Meade Autostar allows users to enter their own asteroids & comets so we've added the Sun as an "asteroid" (side note: the "asteroid" object we created has orbital parameters that cause it to orbit precisely in the same orbit as the Earth... but always on the opposite side of the Sun. This means that whenever the mount is pointed to this imaginary "asteroid" the telescope ends up looking at the Sun instead.) In the object database, you would select "Solar System" -> "Asteroid" -> "SUN" and then perform a "Go To". The mount will move to the position where the Sun would be located if the mount had a perfect alignment (of course you won't have a perfect alignment - but this should get you close.) You can then manually reposition the telescope to point at the Sun and it should continue to track (likely needing an occasional adjustment via the arrow keys on the Autostar handbox.)

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# FAAC Equip Report 5/13/15

By Dennis Salliotte

<u>Item</u>	<u>Currently Held By:</u>	<u>Date Last Verified</u>
<b><u>Telescopes</u></b>		
4" Dobsonian (Harold's donation)	George Korody	1/22/15
<b><u>Presentation Tools</u></b>		
Projector (older)	Jim Frisbie	1/6/15
Projection Screen 8'	Bob MacFarland	5/13/15
Speaker System w/wireless mic	Bob MacFarland	5/13/15
Bullhorn	George Korody	1/22/15
DVD Player	Jim Frisbie	1/6/15
Projection Screen 6'	Mike Dolsen	4/23/15
Projector, ViewSonic	Gordon Hansen	5/13/15
<b><u>Demonstration Tools</u></b>		
Weight On Planets Scale	George Korody	1/22/15
Lunar Phase Kit	Bob MacFarland	5/13/15
100 ft Scale Model Solar System Kit	Bob MacFarland	5/13/15
<b><u>Display Items</u></b>		
Astronomy Event Sign (3' X 6')	Gordon Hansen	5/13/15
PVC Display Board - Folding	Sandra Macika	4/30/15
Banner – Small (24" X 32")	George Korody	1/22/15
Banner – Medium (24" X 72")	Sandra Macika	4/30/15
Banner – Large (32" X 16')	Dennis Salliotte	6/11/15
Tri-Fold Presentation Boards	Don Klaser	1/22/15
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/22/15
<b><u>Other</u></b>		
Canopy (10' X 10')	Tim Campbell	4/2/15
Equipment Etching Tool	Greg Ozimek	4/2/15
Pop Cooler	Michael Dolsen	4/23/15
<b><u>EQUIPMENT KITS</u></b>		
<b><u>Telescopes</u></b>		
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
<b><u>Binoculars</u></b>		
BK3 15x70 binocs, monopod mount	Bob MacFarland	5/13/15
BK4 20x80 binocs, altaz goto mount	Sandra Macika	2/5/15
BK5 25x70 binocs w/tripod adaptor	Tim Dey	2/13/15

# FAAC Equip Report 4/12/15

By Dennis Salliotte

<b><u>Eyepiece Kit</u></b>		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/13/15
<b><u>Other</u></b>		
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
<b><u>Lincoln Park Observatory</u></b>		
LPO Celestron binoviewer #93691	Tim Dey	3/16/15
LPO Celestron 2X 1.25" Barlow	Tim Dey	3/16/15
<b><u>Imaging SIG</u></b>		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	5/13/15
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	5/13/15
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	3/16/15
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	5/13/15
C5 Orion StarShoot Deep Space Video Camera II #52195 AND Orion StarShoot iPhone Control for Deep Space Video Camera II #52195	Gordon Hansen	5/13/15
CA1 Rigel Systems Spectroscope	Gordon Hansen	5/13/15
CA2 Celestron 1.25" to T-Adapter(male thread) Model #93625	Gordon Hansen	5/13/15
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter ans variable 1.25" extender	Gordon Hansen	5/13/15
CA4 Orion StarShoot LCD-DVR #58125 2.5" LCD screen	Gordon Hansen	5/13/15
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	5/13/15
<b><u>Special Event Use Only- Not Available For Loan Out</u></b>		
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	5/15/15
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
Dennis Salliotte equipment@fordastronomyclub.com		

## President's Article

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Without the second etalon the telescope can tune the bandpass of light down to 1 angstrom — excellent for viewing the prominences. With the second etalon it can further tune the bandpass down to .6 angstrom. This narrower bandpass will dim the prominences (they are still visible — just not as bright) but it will greatly improve contrast on the surface to reveal more detail. The second etalon is threaded onto the front of the telescope. One side has a hinge, the other side has a wheel which adjusts a shim. This causes the 2nd etalon to “tilt” very slightly and it’s that “tilt” which tunes the frequency of light which can pass through the filter. Adjust the scope’s built-in etalon first to maximize contrast on the Sun’s surface. Then adjust the second etalon to improve the contrast further. Finally... enjoy the view!

If you would like to borrow the club’s PST, please contact John McGill — the instrument’s caretaker. Dennis Salliotte is the club’s equipment manager and can help put you in contact with John. You can reach Dennis by sending email to [equipment@fordastronomyclub.com](mailto:equipment@fordastronomyclub.com).

Anyone wishing to borrow the scope must first receive an orientation on proper use and care. John can provide this orientation.





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