STAR STUFF

The Newsletter of the Ford Amateur Astronomy Club

Volume 26, Number 2 March 2016

In This Issue

Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

By Ethan Siegel

Imagine a world very different from our own: permanently shrouded in clouds, where the sky was never seen. Never had anyone see the Sun, the Moon, the stars or planets, until one night, a single bright object shone through. Imagine that you saw not only a bright point of light against a dark backdrop of sky, but that you could see a banded structure, a ringed system around it and perhaps even a bright satellite: a moon. That's the magnitude of what LIGO (the Laser Interferometer Gravitational-wave Observatory) saw, when it directly detected gravitational waves for the first time.

An unavoidable prediction of Einstein's General Relativity, gravitational waves emerge whenever a mass gets accelerated. For most systems -- like Earth orbiting the Sun -- the waves are so weak that it would take many times the age of the Universe to notice. But when very massive objects orbit at very short distances, the orbits decay noticeably and rapidly, producing potentially observable gravitational waves. Systems such as the binary pulsar PSR B1913+16 [the subtlety here is that binary pulsars may contain a single neutron star, so it's best to be specific], where two neutron stars orbit one another at very short distances, had previously shown this phenomenon of orbital decay, but gravitational waves had never been directly detected until now.

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President's Article

By Tim Campbell

Thank You… and Help Wanted

I confess it's been quite a while since I actually *looked* through a telescope. Between work and weather, the universe has conspired against me. That means I'm going through a bit of astronomy observation withdrawal. But better observing weather is on the way and quite a few other astronomy events are happening.

Swap Meet

I'm writing this article in advance of the swap meet (otherwise I'd provide an update on how it went), but I'm happy to report that quite a few people have volunteered to make this event happen. This is a really big deal because this event raises money which substantially contributes to the club's annual operating budget.

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STAR STUFF

Jan/Feb 2016 - Vol. 26 No 1

STAR STUFF is published eleven times each year by:

FORD AMATEUR ASTRONOMY CLUB
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Dearborn MI 48121-7527

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VICE PRESIDENT:	Tim Dey
SECRETARY:	Jessica Edwards
TREASURER:	Gordon Hansen
WEBMASTER:	Greg Ozimek
NEWSLETTER EDITOR:	Liam Finn

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.

This months 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/

In plain language: Our annual dues are as cheap as they are *because* of volunteers who make these fund-raising events happen.

Gordon Hansen really was the main organizer behind this year's event, but quite a few other people have volunteered to handle the door, the food, and the talks. I also want to thank Clay Kessler who sponsored the event this year. Clay's business, Telescope Support Systems, is well known for manufacturing precision-machined telescope support rings. But TSS makes quite a few other components (it's not just all mounting rings over at TSS). If your stars aren't round and you're having mount flexure issues... call Clay and ask him to hook you up (tell your friends!) There are many other volunteers (and you'll get updates after the event) but I wanted to thank Gordon and Clay up front.

Club Presentation Schedule

Wondering what the main talk and tech talk will be at the next club meeting? Dale Partin schedules the club presenters and maintains a list. But this list isn't published anywhere. I've had a few members make the suggestion that we should publish the presentation schedules ahead of time. So starting this month, I'm forwarding that schedule to Liam Finn (our Star Stuff Newsletter editor) to include in the Star Stuff. Just remember that we do sometimes have last minute speaker changes (not often, but it happens). If you have a talk you'd like to present, contact Dale (main-talks are typically about 45 minutes in length and tech-talks are much shorter — usually about 15 minutes in length.)

Outreach & Beginner's Night

Friday April 15th is the next outreach event for the year. This is the MSU Statewide Astronomy Night. There are observing locations throughout the state, but we've been asked to set up telescopes at the Michigan Science Center. I'll send details via the club email distribution list (Yahoo Group) as the date approaches with time & locations. This is a STEM (Science Technology Engineering & Math) to draw people (and especially students) into the sciences and, in this case, into astronomy. Influence the interest of a student and show them that exists among the stars!

Saturday April 16th is the first Beginner's Night of the season. The first and last Beginner's Nights are held at Lake Erie Metropark, all others are at Island Lake State Recreation area. But this first night will be at Lake Erie.

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Gravitational Wave Astronomy Will Be The Next Great Scientific Frontier

(continued from Page 1)

When a gravitational wave passes through an objects, it simultaneously stretches and compresses space along mutually perpendicular directions: first horizontally, then vertically, in an oscillating fashion. The LIGO detectors work by splitting a laser beam into perpendicular “arms,” letting the beams reflect back and forth in each arm hundreds of times (for an effective path lengths of hundreds of km), and then recombining them at a photodetector. The interference pattern seen there will shift, predictably, if gravitational waves pass through and change the effective path lengths of the arms. Over a span of 20 milliseconds on September 14, 2015, both LIGO detectors (in Louisiana and Washington) saw identical stretching-and-compressing patterns. From that tiny amount of data, scientists were able to conclude that two black holes, of 36 and 29 solar masses apiece, merged together, emitting 5% of their total mass into gravitational wave energy, via Einstein's $E = mc^2$.

During that event, more energy was emitted in gravitational waves than by all the stars in the observable Universe combined. The entire Earth was compressed by less than the width of a proton during this event, yet thanks to LIGO's incredible precision, we were able to detect it. At least a handful of these events are expected every year. In the future, different observatories, such as NANOGrav (which uses radio telescopes to the delay caused by gravitational waves on pulsar radiation) and the space mission LISA will detect gravitational waves from supermassive black holes and many other sources. We've just seen our first event using a new type of astronomy, and can now test black holes and gravity like never before.

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

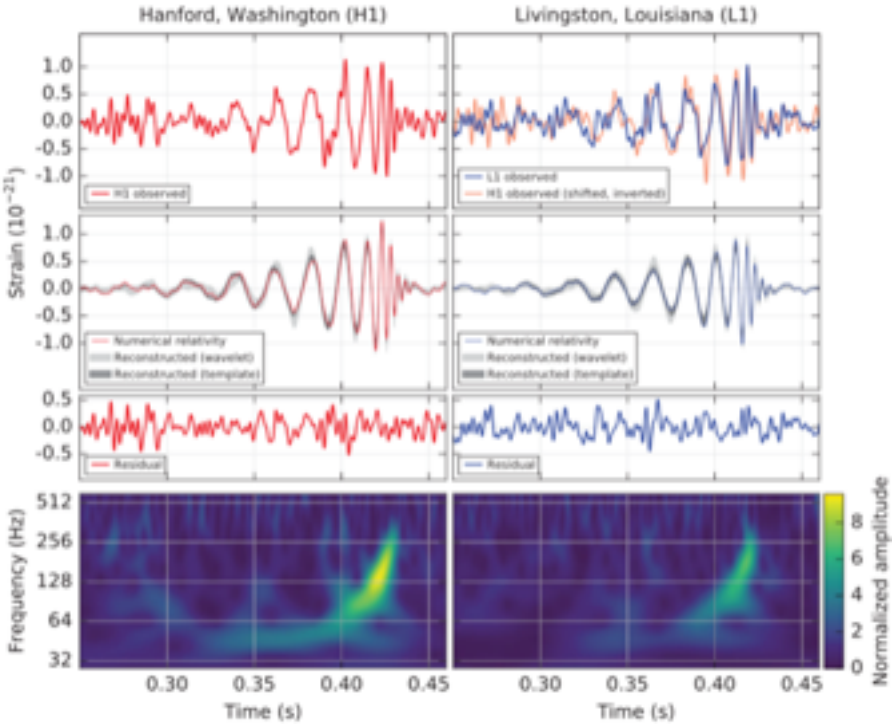
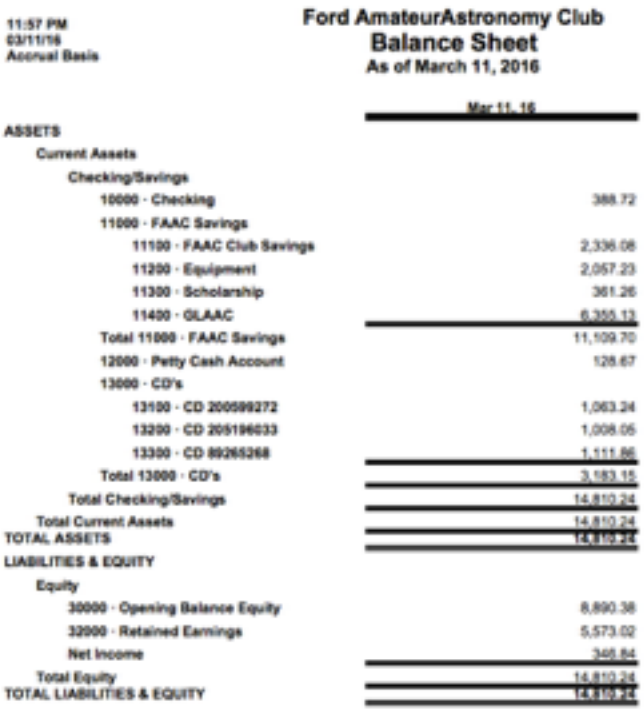


Image credit: Observation of Gravitational Waves from a Binary Black Hole Merger B. P. Abbott et al., (LIGO Scientific Collaboration and Virgo Collaboration), Physical Review Letters 116, 061102 (2016). This figure shows the data (top panels) at the Washington and Louisiana LIGO stations, the predicted signal from Einstein's theory (middle panels), and the inferred signals (bottom panels). The signals matched perfectly in both detectors.

Treasurer's Report
March 16, 2016

By Gordon Hansen



11:57 PM
03/11/16
Accrual Basis

Ford AmateurAstronomy Club
Balance Sheet
As of March 11, 2016

	Mar 11, 16
ASSETS	
Current Assets	
Checking/Savings	
10000 · Checking	388.72
11000 · FAAC Savings	
11100 · FAAC Club Savings	2,336.08
11200 · Equipment	2,057.23
11300 · Scholarship	361.26
11400 · GLAAC	6,355.13
Total 11000 · FAAC Savings	11,109.70
12000 · Petty Cash Account	128.67
13000 · CD's	
13100 · CD 200599272	1,063.24
13200 · CD 205196033	1,008.05
13300 · CD 89265268	1,111.86
Total 13000 · CD's	3,183.15
Total Checking/Savings	14,810.24
Total Current Assets	14,810.24
TOTAL ASSETS	14,810.24
LIABILITIES & EQUITY	
Equity	
30000 · Opening Balance Equity	8,890.38
32000 · Retained Earnings	5,573.02
Net Income	346.84
Total Equity	14,810.24
TOTAL LIABILITIES & EQUITY	14,810.24

President's Article

(continued from Page 2)

Significant Events

Lastly, there are a couple of conversations happening on the club's Yahoo Group email distribution list. The first is regarding locations for observing the Transit of Mercury on Monday May 9th. A couple of observing locations are being discussed (nothing is solid yet). One location is the Lincoln Park Observatory (aka Hector J Robinson Observatory at Lincoln Park Middle School). The other location is the Lyon Township Park (east of Kensington).

The other discussion is around some advance planning for the August 2017 total solar eclipse in the continental US. While that's more than a year away, accommodations for hotels or camping will likely fill up in advance at the most popular destinations.

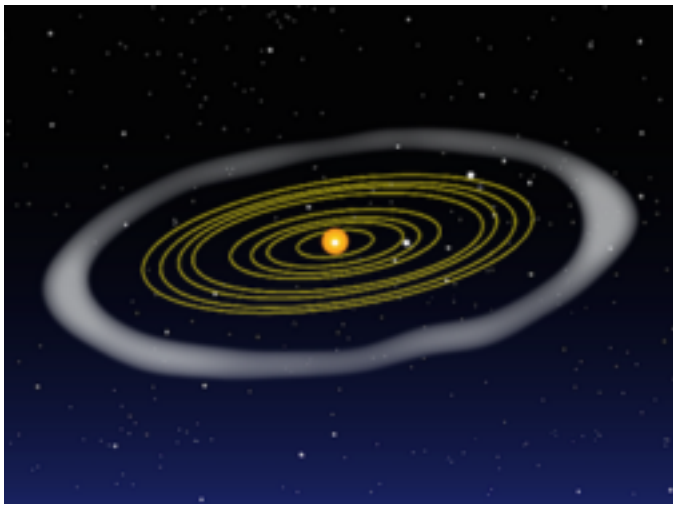
FAAC Speaker Schedule 2016

March 24	Presentation	Stephen Uitti	Pluto
	Tech Talk	Sandra Macika	Science Olympiad - Starry Starry Night
April 28	Presentation	Bob Berta	Archeo Astronomy in the British Isles
	Tech Talk	Chuck Jones	Remote Setup for Imaging
May 26	Presentation	Dr. Nicolle Zellner	Impacts in the Earth-Moon System, What, When and Why
	Tech Talk	Gordon Hansen	FAAC Canon 60Da
June 23	Presentation	Dr. Misconi	An Immigrant's Journey into the Cosmos
	Tech Talk		

For the Young Astronomers
What is the Kuiper Belt

The sun is at the center of our solar system. It is orbited by eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. But what's past Neptune?

Just outside of Neptune's orbit is a ring of icy bodies. We call it the Kuiper Belt. It's pronounced ky-purr.



This is where you'll find dwarf planet Pluto. It's the most famous of the objects floating in the Kuiper Belt, which are also called Kuiper Belt Objects, or KBOs.

Why is it named Kuiper?

The Kuiper Belt is named after a scientist named Gerard Kuiper. In 1951 he had the idea that a belt of icy bodies might have existed beyond Neptune when the solar system formed. He was trying to explain where comets with small orbits came from. No one had seen anything out there yet because it's hard to see small comets past Neptune even with the best telescopes. But even without being able to see it with his own eyes, Kuiper made a prediction. And it turned out to be right.

What's out there?

There are bits of rock and ice, comets, and dwarf planets. Besides Pluto, two other interesting Kuiper Belt Objects are Eris and Haumea. Another interesting Kuiper Belt Object is Haumea. It's shaped like a squashed American football about 1,200 miles (1,931 km) long. It spins end over end every few hours. The strange shape and rotation were caused by a collision with an object about half its size. When Haumea and this other object smashed into each other, the impact blasted away big pieces of ice and sent Haumea spinning.

Haumea also has two moons named Hi'iaka and Namaka.

Eric

Eris is a Kuiper Belt Object a little smaller than Pluto. It is so far away it takes 557 years to orbit the sun. Eris has a small moon named Dysnomia.

The Kuiper Belt is still a very mysterious place, and we have a lot to learn about it. The spacecraft New Horizons flew past Pluto in July of 2015. It will keep exploring the Kuiper Belt and sending us more information about it.

Ford Amateur Astronomy Club Events

Locations are:

LEMP = Lake Erie Metropark
IL = Island Lake State Recreation Area (Spring Mill Pond)
KMP = Kensington Metropark (Maple Beach)

MSU is promoting a state-wide astronomy night (SWAN) for April 15th (the friday before our normal club beginner's night at the Michigan Science Center.

A link to the event is below

http://sciencefestival.msu.edu/about/2016-festival-highlights/statewide-astronomy-night-swan

The List of FAAC Club Events can be found on page 6.

FAAC Schedule of Events 2016

Month	Event	Date	Start Time	Location
April	Beginner Night	Saturday, 16th	8:00pm	LEMP
May	Beginner Night	Saturday, 14th Int'l Astronomy Day	8:00pm	IL
May	Annual Club Banquet	Saturday 21st	6:00pm	Karl's Cabin
June	Beginner Night	Saturday, 11th	8:00pm	IL
July	Beginner Night	Saturday, 9th	8:00pm	IL
August	Club Picnic	Saturday, 13th	8:00pm	IL (Club Picnic)
September	Astronomy At The Beach	Saturday, 10th	6:00pm	KMP
October	Beginner Night	Saturday, 8th	8:00pm	LEMP

Astro Imaging SIG Events

By 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 **10th.** The meeting room location – HFCC Admin. Services and Conference Center (same building), Berry Amphitheater Auditorium.

Topics invited. Pizza served.

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.

Astro Imaging SIG Events

Date	Location	Start Time
April 14th	HFC	5:30 PM
May 12th	HFC	5:30 PM
June 9th	HFC	5:30 PM

FAAC Equip Report 3/19/16

By Dennis Salliotte

Item	Currently Held By:	Date Last Verified
Telescopes		
4” Dobsonian (Harold’s donation)	George Korody	1/7/16
Presentation Tools		
Projector (older)	Gordon Hansen	2/16/16
Projection Screen 8’	Bob MacFarland	1/8/16
Speaker System w/wireless mic	Bob MacFarland	1/8/16
Bullhorn	George Korody	1/7/16
DVD Player	Gordon Hansen	2/16/16
Projection Screen 6’	Mike Dolsen	1/8/16
Projector, ViewSonic	Gordon Hansen	2/17/16
Demonstration Tools		
Weight On Planets Scale	George Korody	1/7/16
Lunar Phase Kit	Bob MacFarland	1/8/16
100 ft Scale Model Solar System Kit	Bob MacFarland	1/8/16
Display Items		
Astronomy Event Sign (3’ X 6’)	Gordon Hansen	2/16/16
PVC Display Board - Folding	Sandra Macika	1/8/16
Banner – Small (24” X 32”)	George Korody	1/7/16
Banner – Medium (24” X 72”)	Sandra Macika	1/8/16
Banner – Large (32” X 16’)	George Korody	1/8/16
Tri-Fold Presentation Boards	Don Klaser	1/8/16
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/7/16
Other		
Canopy (10’ X 10’)	Tim Campbell	2/15/16
Equipment Etching Tool	Greg Ozimek	1/10/16
Pop Cooler	Michael Dolsen	1/8/16

FAAC Equip Report 3/19/16

By Dennis Salliotte

EQUIPMENT KITS	CARETAKER	
Telescopes		
TK3 Celstrn 130 Newt Goto mount	Liam Finn	2/16/16
TK4 Clstrn 90 Refrctr w/man mount	Liam Finn	2/16/16
TK5 4 ½ " Reflector, on Fitz GEM mount	Bob MacFarland	1/8/16
TK6 8" Orion 8XTi Dobsonian	Jennifer Monske CARETAKERSHIP IS AVAILABLE	9/11/15
TK1 Coronado PST solar scope w/double stack, Meade Autostar Goto mount & tripod and accessories	John McGill	1/9/16
Binoculars		
BK3 15x70 binocs, monopod mount	Bob MacFarland	1/8/16
BK4 20x80 binocs,altaz goto mount	Sandra Macika	1/8/16
BK5 25x70 binocs w/tripod adaptor	Tim Dey	1/16/16
Eyepiece Kit		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/16/16
Other		
TA Sky Quality Meter	Syed Saifullah	1/8/16
TA Sky Atlas 2000.0	Tim Dey	1/16/16
TA Orion telescope binoviewer	Liam Finn	2/16/16
Lincoln Park Observatory		
LPO Celestron binoviewer #93691	Tim Dey	1/16/16
LPO Celestron 2X 1.25" Barlow	Tim Dey	1/16/16

FAAC Equip Report 3/19/16

By Dennis Salliotte

Imaging SIG		
C1 Celestron NexImage Solar System Imager model #93712	Gordon Hansen	2/16/16
C2 Meade Deep Sky Imager PRO III w/AutoStar Suite	Gordon Hansen	2/16/16
C3 Orion StarShoot Deep Space Video Camera NTSC #52185 w/video capture device #52178	Gordon Hansen	2/16/16
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	2/16/16
C5 Orion StarShoot Deep Space Video Camera II #52195 AND Orion StarShoot iPhone Control for Deep Space Video Camera II #52195	Gordon Hansen	2/16/16
CA1 Rigel Systems Spectroscope	Gordon Hansen	2/16/16
CA2 Celestron 1.25" to T-Adapter(male thread) Model #93625	Gordon Hansen	2/16/16
CA3 Canon EOS deluxe astrophoto kit FOR Canon bayonet T-thread adapter ans variable 1.25" extender	Gordon Hansen	2/16/16
CA4 Orion StarShoot LCD-DVR #58125 2.5" LCD screen	Gordon Hansen	2/16/16
CA5 Celestron Canon EOS T-ring adapter #93419	Gordon Hansen	2/16/16
Special Event Use Only- Not Available For Loan Out		
TK2 Meade 8" ETX-LS-ACF w/tripod, voice assist, computerized GPS plus MANY (35+) accessories	Tim Dey	1/16/16
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	1/10/16
BK2 Zhumell 25x100 binoculars, hard case & Zhumell TRH-16 tripod w/soft fabric bag	Sandra Macika	1/8/16
TAK1 Night Vision Intensification binocular unit	George Korody	1/7/16
Dennis Salliotte equipment@fordastronomyclub.com		

REMINDER: FAAC membership renewals were due by January 31, 2016.

Annual – New Member: $30
Annual – Renewal: $25 ($30 after January 31)

Since January 31st has past, pleases, send your check for $30 to:

FAAC
P.O. Box 7527
Dearborn, MI 48121-7527

Or bring your money to the next FAAC General Meeting at 5:30 PM in the Berry Amphitheater Auditorium in the Administrative Services and Conference Center on the campus of Henry Ford College.

Membership includes the *STAR STUFF* newsletter, discounts on magazines, discounts at selected area equipment retailers, and after-hours access to the Island Lake and Lake Erie Metropark observing sites, use of the FAAC Yahoo Group, and mentoring program.

Ford Amateur Astronomy Club
Star Stuff Newsletter
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