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Solar Wind Creates—and Whips—a Magnetic Tail Around Earth

By Ethan Siegel

As Earth spins on its axis, our planet's interior spins as well. Deep inside our world, Earth's metal-rich core produces a magnetic field that spans the entire globe, with the magnetic poles offset only slightly from our rotational axis. If you fly up to great distances, well above Earth's surface, you'll find that this magnetic web, called the magnetosphere, is no longer spherical. It not only bends away from the direction of the sun at high altitudes, but it exhibits some very strange features, all thanks to the effects of our parent star.

The sun isn't just the primary source of light and heat for our world; it also emits an intense stream of charged particles, the solar wind, and has its own intense magnetic field that extends much farther into space than our own planet's does.

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President's Article

By Tim Campbell

Meteors & S'mores and Astronomy at the Beach

This has been a busy month for me and I'm behind as I write my President's Corner article... so I'll try to be brief.

Meteors & S'mores

Several Michigan State parks host an observing event for the Perseid meteor showers. Local parks haven't typically offered the event (not that I'm aware) but the dark sky parks have hosted these (Port Crescent & Lake Hudson come to mind).

This year, however, Island Lake decided to host an event and contacted the club for help. They provide the campfires and s'mores, we provide the astronomers and presentations.

I'd like to thank everyone who participated to make the event a success.

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STAR STUFF

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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/>

I'd like to specifically thank Sandra Macika for doing "Shooting Stars" presentations and I'd like to thank Liam Finn for his "Pocket Solar System" presentations. The parks were grateful for your help.

The park estimates that there were 230 people present at the event.

Astronomy at the Beach

We're coming into the home-stretch for this event... which will be Friday and Saturday, September 25 & 26. The event hours are 6pm to Midnight both days.

If you plan to participate in the event (and I'm hoping you will), the club could use volunteers to take a turn at staffing the club table, to serve as a "greeter" (mostly providing information to those arriving from the parking lots), and of course astronomers with telescopes are always appreciated.

If your scope is large enough that you'd prefer to drive your car onto the beach to drop off equipment, this needs to happen so that you'll have enough time to return your car to the parking lot before everything starts at 6pm (I usually plan to arrive by 4pm to setup my equipment and help with anything else the event organizers need.)

If you're new to the club... this event is huge. The parks estimate that somewhere between 4000 and 4500 visitors attend (counting both nights) each year.

One more thing...

There will be a full lunar eclipse on Sunday September 27. The eclipse begins shortly after sunset and will be mostly complete before midnight. This means you don't even need get up in the middle of the night to enjoy it.

GLAAC considered having clubs return to Kensington for the event, but since the Moon will be rising in the East as the eclipse is beginning, we considered that Maple Beach at Kensington doesn't have a very clear view to the East. The Island Lake Park observing site at Spring Mill Pond will have a much clearer view and club members who would like to observe as a group will plan to meet there prior to sunset / moonrise.

(continued on Page 4)

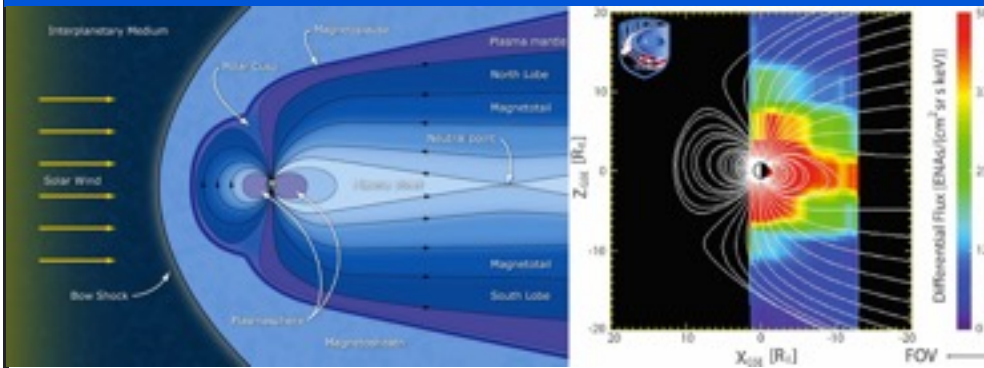


Image credit: ESA / C. T. Russell (L), of Earth's magnetic tail and its cause: the solar wind; Southwest Research Institute / IBEX Science Team (R), of the first image of the plasma sheet and plasmasphere created around Earth by the solar wind.

Solar Wind Creates—and Whips—a Magnetic Tail Around Earth

(continued from Page 1)

The solar wind travels fast, making the 150 million km (93 million mile) journey to our world in around three days, and is greatly affected by Earth. Under normal circumstances, our world's magnetic field acts like a shield for these particles, bending them out of the way of our planet and protecting plant and animal life from this harmful radiation.

But for every action, there's an equal and opposite reaction: as our magnetosphere bends the solar wind's ions, these particles also distort our magnetosphere, creating a long magnetotail that not only flattens and narrows, but whips back-and-forth in the onrushing solar wind. The particles are so diffuse that collisions between them practically never occur, but the electromagnetic interactions create waves in Earth's magnetosphere, which grow in magnitude and then transfer energy to other particles. The charged particles travel within the magnetic field toward both poles, and when they hit the ionosphere region of Earth's upper atmosphere, they collide with ions of oxygen and nitrogen causing aurora. Missions such as the European Space Agency and NASA Cluster mission have just

led to the first accurate model and understanding of equatorial magnetosonic waves, one such example of the interactions that cause Earth's magnetotail to whip around in the wind like so.

The shape of Earth's magnetic field not only affects aurorae, but can also impact satellite electronics. Understanding its shape and how the magnetosphere interacts with the solar wind can also lead to more accurate predictions of energetic electrons in near-Earth space that can disrupt our technological infrastructure. As our knowledge increases, we may someday be able to reach one of the holy grails of connecting heliophysics to Earth: forecasting and accurately predicting space weather and its effects. Thanks to the Cluster Inner Magnetosphere Campaign, Van Allen Probes, Mars Odyssey Thermal Emission Imaging System, Magnetospheric Multiscale, and Heliophysics System Observatory missions, we're closer to this than ever before.

Kids can learn about how solar wind defines the edges of our solar system at NASA Space Place.
<http://spaceplace.nasa.gov/interstellar>

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

August 16, 2015

By Gordon Hansen

Aug 16, 15

ASSETS

Current Assets

Checking/Savings

10000 · Checking 406.02

11000 · FAAC Savings

11100 · FAAC Club Savings 1,414.57

11200 · Equipment 2,070.70

11300 · Scholarship 235.26

11400 · GLAAC 6,516.18

Total 11000 · FAAC Savings 10,236.71

12000 · Petty Cash Account 116.83

13000 · CD's

13100 · CD 200599272 1,062.14

13200 · CD 205196033 1,006.82

13300 · CD 89265268 1,110.42

Total 13000 · CD's 3,179.38

Total Checking/Savings 13,938.94

Total Current Assets 13,938.94

Meeting Agenda - August 27th

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

Opening/Introduction/Member Observing

Main Presentation:

Tech Talk:

Club Projects/Committees/Member Support

Club Business/Secretary/Treasurer/Equipment Reports

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

Topics invited. Pizza served.

FAAC Events 2015

**August 27th - General Membership Meeting-
HFC 5:30p**

**September 10th - Astro Imaging SIG-HFC
5:30p**

**September 17th-20th - Great Lakes Star Gaze-
Gladwin, MI**

**September 25th & 26th - Astronomy at the
Beach-Kensington Metro Park 6p**

October 17th - Beginner's Night-LEMP

*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.

Classified

Dobstuff Telescope For-Sale

with a 16 inch -- 1.5 inch thick -- F4.5 mirror

from a Meade Equatorial Starfinder

Built in September 2011

6 point all aluminum mirror cell

2-speed 2-inch Moonlite Focuser

Destiny curved 3 vane Spider

3.1 inch Coulter Secondary

This is a Push-To Telescope with Homemade Digital Setting Circles (DSC) using a Tungsten T3 Palm Pilot.

Paperwork, history of mirror, sketches, drawings, etc.

All in a 3-ring binder..

Have over \$2100 invested...Selling for \$1875

Rick Arzadon – N8XI

6056 Hipp

Taylor, MI 48180

email: n8xi@juno.com

Telephone: 313-561-4839



FAAC Equip Report 8/12/15

By Dennis Salliotte

<u>Item</u>	<u>Currently Held By:</u>	<u>Date Last Verified</u>
<u>Telescopes</u>		
4" Dobsonian (Harold's donation)	George Korody	1/22/15
<u>Presentation Tools</u>		
Projector (older)	Jim Frisbie	6/30/15
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	7/28/15
<u>Demonstration Tools</u>		
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
<u>Display Items</u>		
Astronomy Event Sign (3' X 6')	Gordon Hansen	5/13/15
PVC Display Board - Folding	Sandra Macika	7/6/15
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	8/12/15
Tri-Fold Presentation Boards	Don Klaser	8/12/15
Tri-Fold Poster Board (Early Club Photos)	George Korody	1/22/15
<u>Other</u>		
Canopy (10' X 10')	Tim Campbell	4/2/15
Equipment Etching Tool	Greg Ozimek	4/2/15
Pop Cooler	Michael Dolsen	4/23/15
<u>EQUIPMENT KITS</u>	<u>CARETAKER</u>	
<u>Telescopes</u>		
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
TK1 Coronado PST solar scope w/double stack, Meade Autostar Goto mount & tripod and accessories	John McGill	1/22/15
<u>Binoculars</u>		
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 8/12/15

By Dennis Salliotte

<u>Eyepiece Kit</u>		
EPK1 Eyepieces, filters & accesories	Liam Finn	2/13/15
<u>Other</u>		
TA Sky Quality Meter	Syed Saifullah	6/22/15
TA Sky Atlas 2000.0	Tim Dey	2/13/15
TA Orion telescope binoviewer	Liam Finn	2/13/15
<u>Lincoln Park Observatory</u>		
LPO Celestron binoviewer #93691	Tim Dey	3/16/15
LPO Celestron 2X 1.25" Barlow	Tim Dey	3/16/15
<u>Imaging SIG</u>		
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
<u>Special Event Use Only- Not Available For Loan Out</u>		
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		

Ford Amateur Astronomy Club
Star Stuff Newsletter
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