



Monthly Notices of the Everglades Astronomical Society



Naples, FL
April 2015

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President's Message

Hello fellow EAS members! I am again excited about the improved weather and our upcoming picnic this coming Saturday, April 11th at the Fak. If the weather does not cooperate, figure on it being rescheduled for the following week. Show up early, pack some food, a chair and be ready to socialize with other members. After dark we will be sharing views through our telescopes. If we are lucky the Virginid meteor shower may even put on a bit of a show.

As always check our calendar for other upcoming events and consider helping. At our next meeting one of the things we will be discussing is a monthly program at the YMCA. The evening programs should present some great opportunities to share our passion for Astronomy with YMCA member families. Details and dates will be established and sent out for volunteers when we get them.

Clear Skies,
Todd Strackbein

Dates for the "Fak"

Usually the best times to go out to the Fakahatchee Strand viewing site are moonless nights. Below is a list of upcoming Saturday nights that you will often find fellow club members out there enjoying the skies with you (weather permitting).

Date	Moonrise	Moonsset
April 11	12:27 a.m.	11:38 p.m.
April 18	5:57 a.m.	7:00 p.m.

Sky Events

April 4 - Full moon
April 11 - Last quarter
April 18 - New Moon
April 25 - First Quarter
April 11, 17,
24 & 27 - Single Transits of Jupiter

Next Meeting

April 14, 2015: Time 7:00 – 9:00 pm
Norris Center, Cambier Park

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Good Stuff Coming Soon To Our Skies By Jackie Richards

We have many things to look forward to through the end of this year, astronomically speaking. If you didn't get a chance to view the lunar eclipse in the early morning of April 4th, just take a look at the picture below to see what you missed. I missed it too, but a friend from North Florida captured it. If you missed it, don't worry as you will have an another opportunity in September.



Lunar Eclipse 4/4/15. "Blood Moon" photo by Sherry Straus of North Florida. Nikon p530 on "moon" setting.

During the month of April, we will be able to see four moon transits of Jupiter on April 11, 17, 24 and 27. The moon is not a factor when viewing transits.

We should also have a fair meteor shower from April 16-25 during the Lyrid Meteor Shower with the peak taking place on the morning of the 23rd. This meteor shower should produce about 20 meteors per hour and the first quarter moon will set shortly after midnight. FYI, this year's Perseid Meteor Shower (which takes place in mid August) should be a good one as our thin crescent moon won't affect viewing much.

But most importantly, don't forget about our Fak picnic which takes place on April 11th. We can all look forward to great company and great viewing, weather permitting of course.

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Calculating the Temperatures of Stellar Cores

By Dennis C. Albright

What is a stellar core?

For stars other than stellar remnants like white dwarfs, neutron stars and black holes or very small stars like brown dwarfs, energy must be generated in order to keep the star from collapsing due to gravity. Fusion of nuclei in the core or the center of the star is the source of this energy.

The Calculation

The STARS_{DAW} code calculates several properties of stellar cores. These results are easily obtained from quantities that are reasonably easily obtained from either Wikipedia web-pages or a relatively sophisticated amateur telescope. If the amateur telescope has a charged coupled device, CCD, the astronomer can readily obtain the stellar surface temperature or preferably the spectral class and the luminosity class and the visible magnitude. The distance to the star can be obtained by parallax. Or you can just look up the star in the Wikipedia, which is how I obtained my stellar data.

The STARS_{DAW} code determines both the nuclear species and primary reactions that occur in the core. A summary of the stars included in this article is provided in Table 1.

Table 1 – Stars Modeled

Star	Type	Luminosity Class
Sun	Main Seq. Dwarf	V
Sirius A	Main Seq. Dwarf	V
Vega	Main Seq. Dwarf	V
Procyon A	Sub Giant	IV
Thuban	Giant	III
Alphard	Bright Giant	II
Rigel	Bright Super Giant	Ia
Betelgeuse	Int. Super Giant	Iab

Core Temperature

The STARS_{DAW} code calculates the following intensive properties of the stellar core: the core temperature, T_{core} , total core pressure, p_{core} , and core density, ρ_{core} . The results of the calculation of the core temperature for the stars listed in the previous Table 1 are shown in Table 2 along with the stellar mass, M_s , of these stars.

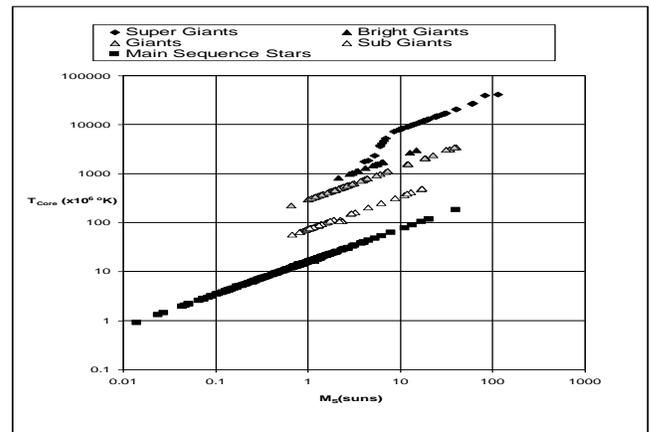
The core temperatures of the super giant stars are much higher than those of the main sequence stars. It is these high core temperatures that allow complex nuclei like Si^{28} to overcome the electrostatic repulsion and fuse to become larger complex nuclei like Fe^{56} . It is also important to note here that Iron nuclei are the most stable and therefore will not fuse together except in supernova explosions.

The results of the calculation of the core temperature for approximately 500 stars are shown in Figure 1.

Table 2 – Core Temperature

Star	M_s (suns)	T_{core} ($\times 10^6$ °K)
Sun	1.00	15.60
Sirius A	2.30	27.18
Vega	2.59	29.42
Procyon A	1.39	93.41
Thuban	3.85	736.93
Alphard	3.03	1046.96
Rigel	18.00	12019.50
Betelgeuse	18.50	12241.06

Figure 1 – Core Temperature, T_{core} , vs the Stellar Mass, M_s



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Fak and Other Pictures



Photo by Chuck Pavlick. Jupiter, the Great Red Spot, Io and Io's shadow. 3/19/15



Denise Sabatini and Rick Piper at the Golisano Children's Museum on March 7, 2015.

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The Cold Never Bothered Me Anyway

By Ethan Siegel

For those of us in the northern hemisphere, winter brings long, cold nights, which are often excellent for sky watchers (so long as there's a way to keep warm!) But there's often an added bonus that comes along when conditions are just right: the polar lights, or the Aurora Borealis around the North Pole. Here on our world, a brilliant green light often appears for observers at high northern latitudes, with occasional, dimmer reds and even blues lighting up a clear night.

We had always assumed that there was some connection between particles emitted from the Sun and the aurorae, as particularly intense displays were observed around three days after a solar storm occurred in the direction of Earth. Presumably, particles originating from the Sun—ionized electrons and atomic nuclei like protons and alpha particles—make up the vast majority of the solar wind and get funneled by the Earth's magnetic field into a circle around its magnetic poles. They're energetic enough to knock electrons off atoms and molecules at various layers in the upper atmosphere—particles like molecular nitrogen, oxygen and atomic hydrogen. And when the electrons fall back either onto the atoms or to lower energy levels, they emit light of varying but particular wavelengths—oxygen producing the most common green signature, with less common states of oxygen and hydrogen producing red and the occasional blue from nitrogen.

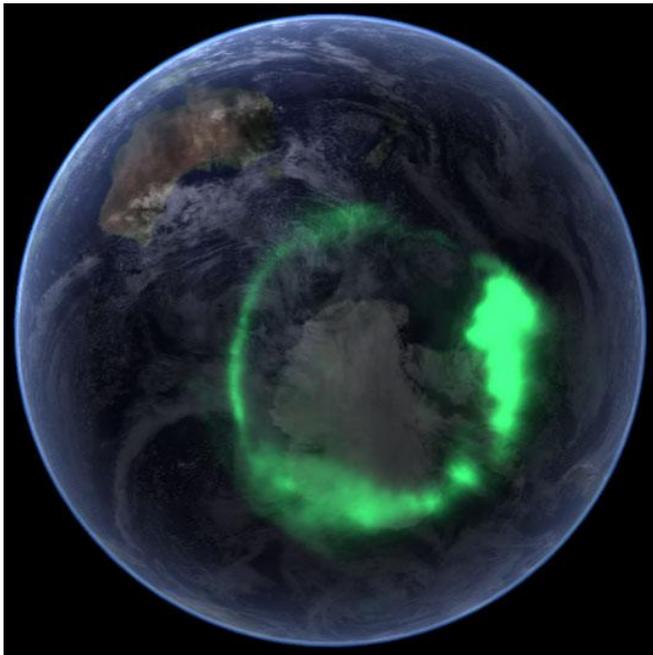


Seagull Nebula taken by Chuck Pavlick on 3/20/15 at the Fak.



Golisano Children's Museum. Charlie Paul assisting at the Golisano Children's Museum on March 7, 2015.

But it wasn't until the 2000s that this picture was directly confirmed! NASA's Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite (which ceased operations in December 2005) was able to find out how the magnetosphere responded to solar wind changes, how the plasmas were energized, transported and (in some cases) lost, and many more properties of our magnetosphere. Planets without significant magnetic fields such as Venus and Mars have much smaller, weaker aurorae than we do, and gas giant planets like Saturn have aurorae that primarily shine in the ultraviolet rather than the visible. Nevertheless, the aurorae are a spectacular sight in the evening, particularly for observers in Alaska, Canada and the Scandinavian countries. But when a solar storm comes our way, keep your eyes towards the north at night; the views will be well worth braving the cold!



Auroral overlays from the IMAGE spacecraft. Image credit: NASA Earth Observatory (Goddard Space Flight Center) / Blue Marble team.

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Items For Sale or Trade or Wanted:

http://www.naples.net/clubs/eas/equipment_sales.html

Useful links (software, telescope making, telescope and equipment suppliers, astronomical data sources, iPhone and iPad Apps and more):

<http://www.naples.net/clubs/eas/links.html>

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EAS 2015 DUES

For the bargain price of only \$20.00 per family, all this can be yours this year:

- Meet with your fellow astronomy enthusiasts at least 10 times a year;
- Learn about astronomy and telescopes. Check out our club scope;
- Many opportunities to view planets, nebulae and other celestial objects (even if you don't have your own telescope); and
- Enjoy the many astronomy programs at our regular monthly meetings.

Don't miss out! Fill out this form (please print clearly) and send it with your \$20 check to the Everglades Astronomical Society, P. O. Box 1868, Marco Island, Florida, 34146.

Name:

Address:

Phone:

Email:
