



Monthly Notices of the Everglades Astronomical Society



Naples, FL
February 2017

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President's Message

Our January meeting was fabulous. Chap Percival gave an inspiring talk on going to see the eclipse. Because of his book, my sister and I are taking not one, but two kids to see the eclipse. Hopefully you can round up a kid or two to take with you. If you missed the meeting, you can go to his web site, www.goseetheeclipse.com, and order his book.

I will be giving the presentation for the February meeting. The topic is Celt Archaeoastronomy in the U.S.A. Like most of my talks, I'll be reading about one topic and get side tracked by another. About 2 1/2 years ago, I ran into this topic. I can't even remember what the other topic was that I intended to research. I'm hoping that this topic will be a good start to your St. Patrick's Day season.

The May and June meetings have yet to be booked with a speaker. Hopefully you have a topic or experience that you would like to share with us. If you'd like to give a presentation and are looking for ideas, I have a very large list. Or, perhaps there is a person that you would like to hear. Just let me know and I'll do my best to schedule him/her.

We have several special events coming up this winter and spring. We always need people to help man the displays. Not only do you get a chance to meet with the public and spread your passion for astronomy with them, but it is also a good opportunity to get to know the members of our club. I seriously hope that you will consider participating.

Clear skies, Denise Sabatini

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	Moonset
Feb. 18	12:31 a.m.	11:54 a.m.
Feb. 25	6:11 a.m.	5:44 p.m.

Sky Events

Feb. 3 - First Quarter
Feb. 11 - Comet 45P/Honda makes its closest approach to Earth
Feb. 12 - Full Moon
Feb. 20 - Last Quarter
Feb. 26 - New Moon

Next Meeting

February 14, 2017: Time 7:00 – 9:00 pm
Norris Center, Cambier Park

IMPORTANT REMINDER:

**THE WINTER STAR PARTY IS
FEBRUARY 20-26, 2017 - DON'T
FORGET TO GET YOUR TICKETS!!!!**

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PHOTOS BY EAS MEMBERS

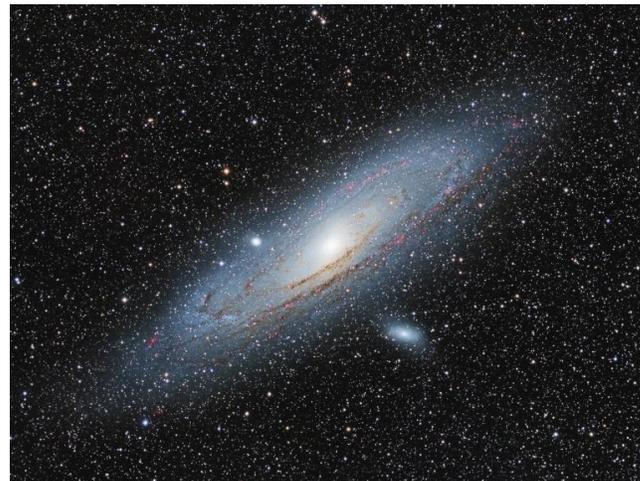


Photo by Brian McGaffney taken mid-December 2016 near Marco Island. Andromeda Galaxy. To view all of Brian's photos directly from his website (the Nutwood Observatory), go to: <http://www.nutwood-observatory.com/>



Rosette Nebula by Chuck Pavlick. Camera: Starlight Xpress SX25C; Scope: William Optics FLT110 w/focal reducer; Captured in Nebulosity and Processed in Pixinsight & Photoshop; Filter: Orion Skyglow; 30 @ 240 seconds; January 2017. To view this and other photos directly from Chuck's website, go to: <http://www.pbase.com/hobbynaut/image/164883275> .

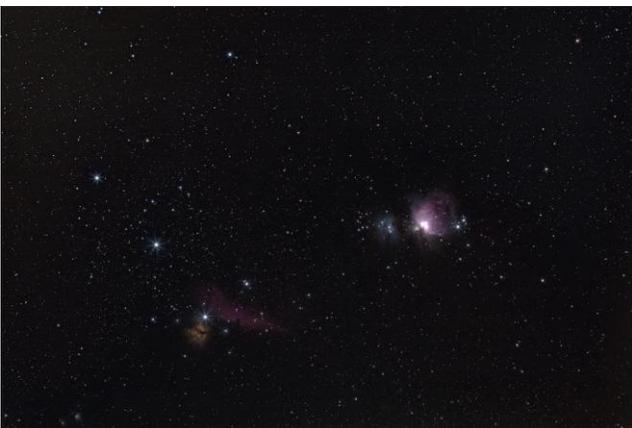


Photo by Brian McGaffney. The entire region of Orion, shows Belt, M42, Running Man and HorseHead Nebula. Taken mid-December 2016 near Marco Island. To view all of Brian's photos directly from his website (the Nutwood Observatory), go to: <http://www.nutwood-observatory.com/>

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Published Articles by EAS Members

Ted Wolfe's article in the Naples News/Collier Citizen on January 25, 2017: Looking Up: An ancient swarm of suns

<http://www.naplesnews.com/story/news/local/communities/collier-citizen/2017/01/25/looking-up-ancient-swarm-suns/97057230/>

TO VIEW THE ABOVE ARTICLE, PRESS "CTRL" AND LEFT CLICK BUTTON.

The below link provides previous articles in the Collier Citizen by Ted Wolfe that appeared over past years.

<http://search.naplesnews.com/jmg.aspx?k=looking+up+ted+wolfe>

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UPCOMING EAS EVENTS

EAS members volunteer time and knowledge at many events throughout the year. Below is a list of upcoming public events at which the EAS will be present. Volunteers are needed at these events. You can help out even if you don't have a scope. Those with scopes need breaks for meals so extra help is required to watch equipment and to help out at our booth. If you would like to volunteer at any of these events, please contact Charlie Paul.

Feb. 18th – Collier Seminole State Park (nighttime event) – 7:00 p.m.

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Interactive Site for
best solar eclipse locations
Contributed by Bart Thomas

http://xjubier.free.fr/en/site_pages/solar_eclipses/TSE_2017_GoogleMapFull.html?Lat=33.6647&Lng=-80.7789&Zoom=9&Map='ROADMAP'&OMap=0

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STARSDAW: A Program to Model and Simulate Stars By Dennis Albright

The accurate calculation of stellar properties from data readily obtained from observations with a telescope is sometimes relatively difficult. For this reason I wrote the STARSDAW program which enables the amateur observer or astronomy student to accurately perform this calculation and obtain relatively accurate information about virtually all types of stars. This information includes the stellar properties, the properties of the stellar core, the color composition of the light from the star, its evolutionary history and whether the star may have habitable earth-like planets.

Some of the types of calculations performed by the STARSDAW code are demonstrated in References 1 through 5.

Types of Stars Modeled

The STARSDAW code models three main types of stars, non-periodic stars, periodic stars and exploding stars. The STARSDAW code models all 7 luminosity classes of non-periodic stars ranging from hyper giants and super giants, luminosity class I, thru white dwarfs, luminosity class VII. Luminosity class I is further subdivided between into the

various types of hyper giants and super giants. The main sequence is also subdivided into main sequence dwarfs, Luminosity Class V, cool sub dwarfs, Luminosity Class VI, and red dwarfs and brown dwarfs, also in Luminosity Class VI.

The STARSDAW code also accurately models several types of periodic stars including Type I, Type II and dwarf Cepheid variables, beta-Cepheid variables, RR Lyrae stars, long period variables including Mira variables, semi-regular variables and carbon stars, and luminous blue variables.

The STARSDAW also models exploding stars including two types of novae and several types of supernovas, hypernovas and gamma-ray bursts. The remnants of these exploding stars, planetary nebulae and supernova remnants are also modeled.

Input Requirements

The input requirements of the STARSDAW program are relatively simple and readily obtained from astronomical web page like the Wikipedia or observations with a relatively sophisticated photographic telescope.

The first required input is used to determine the stellar surface temperature. This input can be either the spectral class of the star, its stellar surface temperature or the B-V index commonly used with photographic plates.

The next input requirement is either the absolute magnitude of the star or the visual magnitude and the distance to the star in light years.

If the user knows type of star modeled, he can select the appropriate type of star and obtain the distance to the star using spectroscopic parallax or the magnitude/period relationship for periodic stars. The calculation of stellar distances is demonstrated in References 1 and 2. After these quantities are input the calculations can be done.

Stellar Properties

From these relatively sparse input requirements the STARSDAW code calculates the stellar properties of the star including its absolute magnitude, luminosity, surface temperature, stellar mass, stellar radius and luminosity class. The absolute bolometric magnitude, M_A , of the star is calculated from the visual magnitude, M_V , and the distance to the star, d , and taking into account both bolometric correction, used to take into account the total amount of energy in all wavelengths that the star emits, and interstellar absorption.

If the star is a member of a multiple star system, as many are, the absolute bolometric magnitude is also corrected for the light fraction of the star relative to absolute bolometric magnitude of the multiple star system.

The stellar surface temperature, T_S , can either be input directly to the STARSDAW program or calculated from the spectral class or B-V index.

From the absolute bolometric magnitude and the stellar surface temperature, T_S , the STARSDAW program obtains the luminosity of the star using an empirical multiplier times the standard relation between the absolute magnitude, M_A .

The mass of the star, M_S , is calculated using a similar empirical multiplier times the standard correlation for the mass of the star. A similar empirical relationship is used to calculate the stellar radius, R_S .

The accuracy of the STARSDAW code in calculating stellar properties is far more than adequate for use as a teaching aid, a tool for amateur astronomers or a methodology for preliminary astronomical calculations.

Stellar Core

The STARSDAW code determines the types of nuclear reactions occurring within a star using the star's mass, M_S , and its luminosity class. The STARSDAW program also calculates the energy of each reaction per nucleon to give the user an idea of the energy released in the reaction. This calculation uses the binding energy of the nuclei involved in the reaction.

The STARSDAW program also calculates the properties of the stellar core, including its mass, radius, density, pressure and temperature. The average kinetic energy of the nuclei and electrons at the center of the star is also calculated. This calculation is demonstrated in Reference 5.

Composition of the Light

The STARSDAW program also determines the percentage the light from the star in the different bands of the electromagnetic spectrum. These different bands include radio, microwave, infrared, visible and ultraviolet. The visible band is further broken into its component colors.

Stellar Evolutionary Model

The stellar evolutionary model shows how the star will evolve over its entire history. The STARSDAW program has several

different evolutionary paths determined by initial stellar mass. The luminosity class of the star determines the starting point on the evolutionary model.

The STARS DAW program calculates the type of stellar object and its important properties including luminosity class, absolute magnitude, the luminosity, the stellar mass, the surface temperature and the radius for descendents of the star. The STARS DAW program also calculates the lifetime, τ_L , for the star and its descendents.

The Search for Life

The STARS DAW program also facilitates the search for life in the Universe. It does so by first evaluating whether the star can have habitable earth-like planets. Firstly, the star must not be a member of a multiple star system because this would lead to unstable planetary orbits.

Furthermore, the star must have a surface temperature in such that a large enough fraction of its light in the green portion visible range so that photosynthesis is possible

Finally, the star must be relatively stable. This means it cannot be a periodic star. Furthermore, the star's lifetime in its present stage of evolution must be long enough to allow the evolution of life.

If the star is found to have planets orbiting it, the effect of the planets on the probability of life occurring is calculated as are the orbital parameters and surface temperature of these planets. Use of this calculation is demonstrated in References 3 and 4.

If the star is found to be suitable, then the STARS DAW program calculates the radius of the orbit of planet for a range of nearly earth-like temperatures and then the orbital periods of these orbits are calculated.

References

1. EAS Newsletter July 2013, Measuring Stellar Distances – Spectroscopic Parallax, Dennis Albright
2. EAS Newsletter February 2014, Measuring Stellar Distances using Periodic Stars, Dennis Albright
3. EAS Newsletter June 2014, The Number of habitable Planets in the Milky Way, Dennis Albright
4. EAS Newsletter October 2014, Calculating the Properties of Exoplanets, Dennis Albright
5. EAS Newsletter April 2015, Calculating the Temperatures of Stellar Cores, Dennis Albright

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Comet Campaign: Amateurs Wanted

By Marcus Woo

In a cosmic coincidence, three comets will soon be approaching Earth—and astronomers want you to help study them. This global campaign, which will begin at the end of January when the first comet is bright enough, will enlist amateur astronomers to help researchers continuously monitor how the comets change over time and, ultimately, learn what these ancient ice chunks reveal about the origins of the solar system.

Over the last few years, spacecraft like NASA's Deep Impact/EPOXI or ESA's Rosetta (of which NASA played a part) discovered that comets are more dynamic than anyone realized. The missions found that dust and gas burst from a comet's nucleus every few days or weeks—fleeting phenomena that would have gone unnoticed if it weren't for the constant and nearby observations. But space missions are expensive, so for three upcoming cometary visits, researchers are instead recruiting the combined efforts of telescopes from around the world.

"This is a way that we hope we can get the same sorts of observations: by harnessing the power of the masses from various amateurs," says Matthew Knight, an astronomer at the University of Maryland.

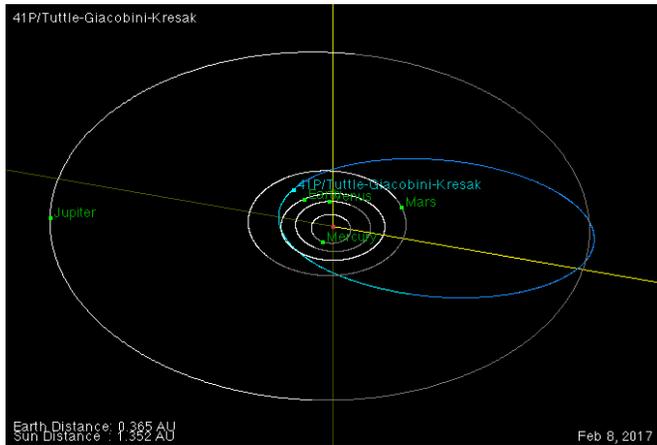
By observing the gas and dust in the coma (the comet's atmosphere of gas and dust), and tracking outbursts, amateurs will help professional researchers measure the properties of the comet's nucleus, such as its composition, rotation speed, and how well it holds together.

The observations may also help NASA scout out future destinations. The three targets are so-called Jupiter family comets, with relatively short periods just over five years—and orbits that are accessible to spacecraft. "The better understood a comet is," Knight says, "the better NASA can plan for a mission and figure out what the environment is going to be like, and what specifications the spacecraft will need to ensure that it will be successful."

The first comet to arrive is 41P/Tuttle-Giacobini-Kresak, whose prime window runs from the end of January to the end of July. Comet 45P/Honda-Mrkos-Pajdusakova will be most visible between mid-February and mid-March. The third target, comet 46P/Wirtanen won't arrive until 2018.

Still, the opportunity to observe three relatively bright comets within roughly 18 months is rare. "We're talking 20 or more years since we've had anything remotely resembling this," Knight says. "Telescope technology and our knowledge of comets are just totally different now than the last time any of these were good for observing."

For more information about how to participate in the campaign, visit <http://www.psi.edu/41P45P46P>.



An orbit diagram of comet 41P/Tuttle-Giacobini-Kresak on February 8, 2017—a day that falls during the comet's prime visibility window. The planets orbits are white curves and the comet's orbit is a blue curve. The brighter lines indicate the portion of the orbit that is above the ecliptic plane defined by Earth's orbital plane and the darker portions are below the ecliptic plane. This image was created with the Orbit Viewer applet, provided by the Osamu Ajiki (AstroArts) and modified by Ron Baalke (Solar System Dynamics group, JPL). <http://ssd.jpl.nasa.gov/sbdb.cgi?orb=1;sstr=41P>

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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 2017 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: _____