Monthly Notices of the Everglades Astronomical Society

Naples, FL
October 2014

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President's Message

Greetings to all! I'm excited that the weather is improving and night sky viewing opportunities are increasing. We hope to see many in attendance at the FAK this weekend.

Later this month we have an opportunity to do some sidewalk astronomy. Our club was invited to set up around 5th and 5th for public viewing during the city's annual Halloween Spooktacular on Friday, Oct. 31st from 4:30-9:30pm. Fifth Ave will be closed to traffic and we can expect a nice size crowd to work with. This should be an exciting event with additional info at meeting.

Our own Charlie Paul will be running this Tuesday's meeting in my absence and presenting. Our typical meeting agenda includes the first 15-30 minutes for club business discussions, a quick break to socialize and then into the presentation.

Lastly, Winter Star Party tickets have gone on sale to the general public. Attendance should be up again and will probably sell out early. If interested don't waste time and get your ticket! Link is below. https://www.regonline.com/builder/site/Default.aspx?EventID=1569282

Clear Skies,
President 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	Moonset
October 18	1:53 a.m.	2:50 p.m.
October 25	8:03 a.m.	7:21 p.m.

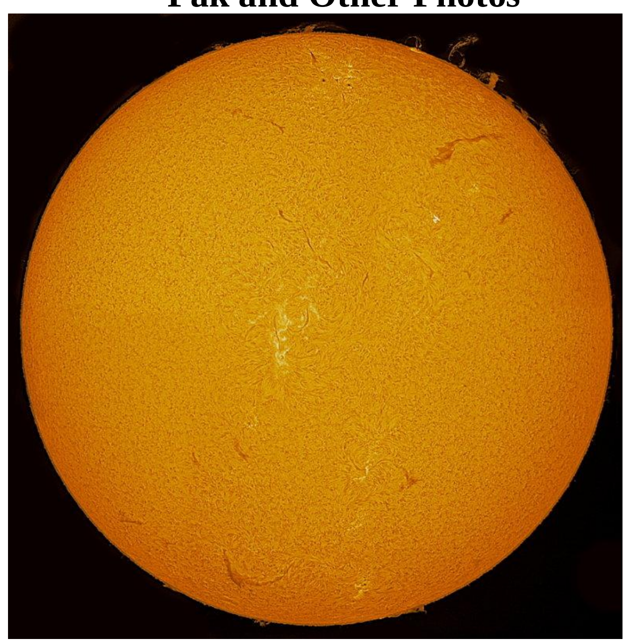
Sky Events

October 1 - First quarter
October 8 - Full moon
October 15 - Last quarter
October 21 - Orionids Meteor Shower
October 23 - New Moon

Next Meeting

October 14, 2014: Time 7:00 – 9:00 pm
Norris Center, Cambier Park

Fak and Other Photos



The Sun taken by Chuck Pavlick 9/18/14; four panel mosaic; Lunt 60THa solar scope, DMK21AU618; processed in Registax & Photoshop.

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Calculating the properties of Exoplanets

By Dennis C. Albright

Defining and Detecting Exoplanets

An exoplanet is a planet that orbits a star other than the sun. Hundreds of exoplanets have been discovered orbiting other stars and more are being discovered every day.

Two methods have been used to detect these planets. The first method determines the presence of a planet due the wobble that the invisible exoplanet causes in the motion of the host star. All stars have a proper motion through space that can be detected by periodic observations with a very good telescope. Stars without planets will move in a straight line, while those with planets will wobble slightly due to the gravitational attraction between the star and its planets. The period of the wobble can be used to determine the radius of the planet's orbit. The size of the wobble can be used to determine the planet's mass. If a star has multiple planets, the total size of the star's wobble will be the sum of the wobbles caused by each of the orbiting planets and then both the period and magnitude caused by each of the planets can be extracted from the wobble of the star.

Another way of determining if a stable, non-periodic star has planets is to measure the luminosity of the star and if there are small periodic variations in this luminosity, it may be due to a planet periodically partially eclipsing the star.

Using these two techniques, four main types of exoplanets have been detected: hot Jupiters, cold Jupiters, faint unresolved brown dwarfs and terrestrial planets.

Hot Jupiters are giant planets with sizes and compositions similar to the four giant planets in our solar system: Jupiter, Saturn, Uranus and Neptune. However, hot Jupiters have orbital radii less than or comparable to that of Mercury and therefore very small orbital periods and very high surface temperatures.

Due to the accuracy of our astronomical measurements and the limitations of our resources hot Jupiters are the most frequently detected type of exoplanets.

Cold Jupiters are similar to the giant planets in our solar system in size, composition, orbital period, orbital radius and surface temperature. Because they are extremely faint, the properties (except the mass and orbital period of cold Jupiters) cannot be determined.

Unresolved faint brown dwarfs are far more massive than any type of planets and also generate their own luminosity. Since the luminosity of these brown dwarfs is much less than that that of the host star, these objects have also been detected by the two methods described above.

Terrestrial planets have masses and compositions similar to that of the 4 terrestrial planets in our solar system: Mercury, Venus, Earth and Mars. Because of their very small masses relative to the host star, terrestrial planets are extremely difficult to detect.

Calculated Results for Exoplanets

Wikipedia usually gives as a minimum the orbital period and the mass of the exoplanet usually in the units of Jupiters. From this data the STARSDAW code calculates the orbital radius of the exoplanet, the radius of the exoplanet and the average surface temperature of the exoplanet.

The STARSDAW code calculates the orbital radius, R_g, from the orbital period, t_p. A comparison between the results calculated by the STARSDAW code, R_{gC}, and the measured results, R_{gM}, for the orbital radius is shown in Figure 1. This figure shows extremely good agreement between the two sets of results with all of the data points lying on the agreement line.

The average surface temperature of an orbiting body, T_g, is also calculated by the STARSDAW code from the orbital radius of the exoplanet, R_{gC}, and the luminosity of the host star, L_S, which is one of the stellar properties calculated by the STARSDAW code. A comparison between the results for average surface temperature of an orbiting body calculated by the STARSDAW code, T_{gC}, and the measured results obtained from the Wikipedia, T_{gM}, is shown in Figure 2. This figure shows very adequate agreement between the two sets of results with most of the data points lying on or near the agreement line.

The planetary radius of a giant planet, r_{sp}, is also calculated by the STARSDAW code. A comparison between the results calculated by the STARSDAW code, r_{spC}, and the measured results, r_{spM}, for the planetary radius is shown in Figure 3. This figure shows very adequate agreement between the two sets of results with most of the data points lying on or relatively near the agreement line.

Figure 1 Comparison of Results for the Orbital Radius, R_g

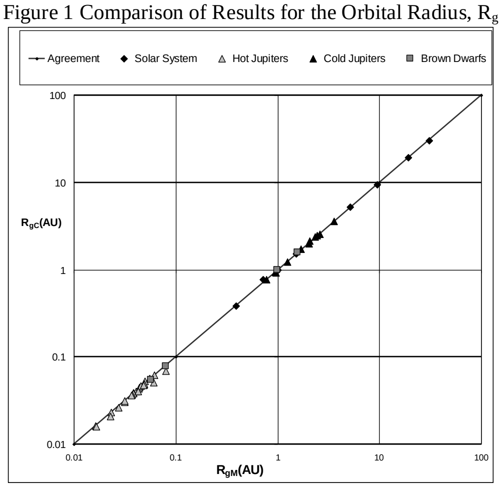


Figure 2 Comparison of Results for the Average Surface Temperature, T_g

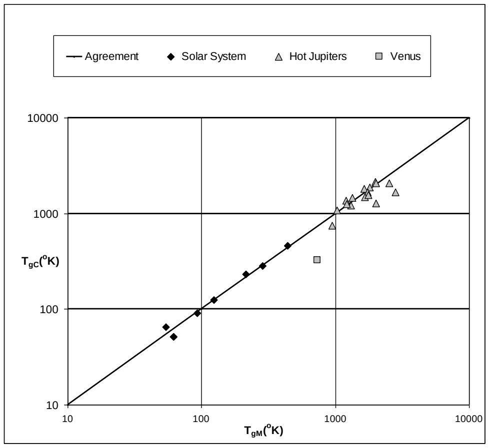
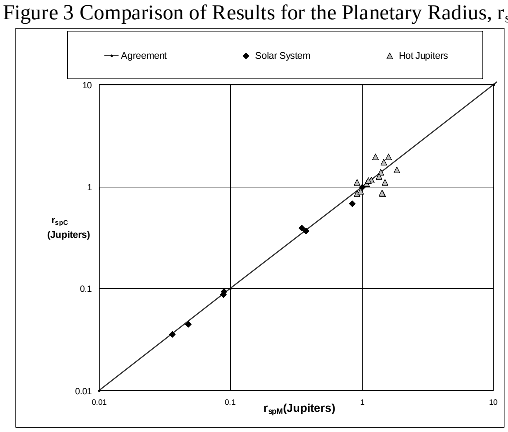


Figure 3 Comparison of Results for the Planetary Radius, r_{sp}



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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 2014 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:

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Address:

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Phone:

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Email:

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