

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

9th June 2008

**Samuel George (FRAS)
(University of Birmingham) –
'The Hunt for Aurorae on Extrasolar Planets'**

This is our last meeting of the season before our summer break. We meet again next September. I hope you all have a good summer. Remember that if it's too light to do any night-time astronomy, then you can always look at the Moon or, if you have an appropriate filter, do some solar astronomy.

THE NIGHT SKY THIS MONTH

by Bob Dryden

With summer upon us, observing time is short and often at unsociable hours. However, over the summer we have not one, but two eclipses, the prospect of a good meteor shower, and the return of Venus to the evening sky later in the season.

Sun: The summer solstice occurs on 20th June at 23hrs 59 mins. At this moment the Sun reaches its most northerly point on the ecliptic, in the constellation of Gemini. Of course, this is the longest day, but take heart in the fact that the days are shorter (and consequently, the nights longer) for the next six months. Hopefully, by 4th July we will be basking in hot sunshine. If we are, on that particular day consider the fact that the Earth reaches aphelion. This means our planet is at its furthest from the Sun all year, at a distance of 152 million kilometres (which is 5 million kilometres further than when at its nearest).

Mercury: Following its 7th June conjunction with the Sun, Mercury enters the morning sky towards the end of the month. Unfortunately, it is a very poor apparition and the planet never gets higher than about 10 degrees by sunrise so it will be very difficult to see. Mercury reaches superior conjunction on 29th July and reappears in the evening sky. However, the poor morning apparition is followed by an equally poor evening one. This time it never gets much more than 5 degrees above the horizon so will be extremely hard to observe.

Venus: After its 9th June solar conjunction, Venus stays hidden in the Sun's glare until near the end of August when, at a very bright magnitude of -3.8, you should be able to pick out the planet very low in the west just after sunset. In the first week of September, Venus, Mars, and Mercury are all close together but it will be a difficult observation to make, but certainly a rewarding challenge. On 1st September the thin, 2 day old Moon will be just

below the three planets but, again, it will be difficult to actually see.

Mars: Now crossing Leo, Mars is rapidly entering the evening twilight. By the end of July it sets just 45 minutes after sunset and as it is only +1.6 mag, it will be difficult to see by then. On the evening of 30th June, Mars is one degree north of the first magnitude star Regulus, low in the west.

Jupiter: Throughout summer Jupiter will be low towards the south as it crosses Sagittarius. Opposition occurs on 9th July which means the planet is really only observable after midnight for a large part of the summer. It is a bright -2.6 mag, which means it will not be hard to find, but the low altitude will not make for good telescopic views. If you need a guide to find Jupiter, the bright gibbous Moon will be about 5 degrees south of the planet on 20th June, and about 4 degrees south east of Jupiter on 13th August.

Saturn: Like Mars, Saturn is quickly heading towards the Sun now, and will be gone by the end of July. The rings close to about 5 degrees by July which means they are getting harder and harder to see, but give it a try to find out how good your telescope is. On the evening of 6th July there will be a nice crescent Moon about 3 degrees east of Saturn, low in the west. If you fancy a hard challenge, Mars and Saturn are just 38 arc minutes apart on 10th July, so both will be visible in the same telescopic field. However, they will be very low in the west, and in bright twilight which is why the observation will be a hard challenge.

Uranus + Neptune: Uranus is still in Aquarius and Neptune in Capricornus which effectively means that they are both morning objects. Both are easily visible as 'stars' in binoculars, and they will be higher in the sky (and so easier to see) later in the summer.

Lunar eclipse: August 16th gives us a partial lunar eclipse. The umbral part of the eclipse (which is the part of the eclipse most people first notice) begins at 19.36 UT. The Moon actually rises above the horizon at 19.11 UT so, obviously, you will need a clear south eastern horizon to catch the beginning. As the Moon is in Sagittarius that night, it will not actually rise much higher than 10 degrees at any time during the night so a clear southern horizon is required. Mid eclipse occurs at 21.10 UT, and the umbral eclipse ends at 22.44 UT. The Moon never enters the umbral shadow completely (hence, only a partial eclipse), but 8/10ths of the lunar disc will be eclipsed.

Solar eclipse: The other eclipse of the summer is a partial solar eclipse on 1st August. The Sun will be high in the sky throughout the event, but, of course, solar filters will be needed at all times as the solar disc is never totally covered. The eclipse starts at 8.33 UT and ends at 10.05

UT. Sadly, only 2/10ths of the solar disc will be covered by the Moon so it will not be the most spectacular eclipse but still worth having a look at.

Meteors: If it's summer, then it must be time for the Perseids. Sure enough, the shower is active from July 23rd to August 20th. Maximum is on the night 11th/12th August, probably around 09.00 UT on the 12th, when you can expect approximately 80 meteors an hour. On the 11th August the Moon is 11 days old and so a real problem for evening observations. However, it sets at about 23.30 UT so there will be a few hours before dawn in which to look for the meteors. In any case, just before dawn on the 12th should be the best time to observe anyway as the maximum is expected around 09.00 UT. So wrap up warm (it can get quite chilly by dawn, even in August) and get out there.

Asteroids: There are two bright asteroids visible this summer.

Asteroid 2 Pallas crosses Cetus, Eridanus, and Lepus, and brightens from magnitude 9.7 to 9.0 by September. Asteroid 4 Vesta is in the same part of the sky, crossing Pisces and Cetus. It is brighter at magnitude 8.2 in June, rising to 7.3 by September, so binoculars are all you need. Both are morning sky objects, and will be easier to see (ie: higher in the sky) the longer the summer goes on.

Comets: There are no bright periodic comets during summer. However, comet 19P Borelly is on view in the evening sky as it crosses Taurus, Gemini for most of August, and then Cancer. It brightens from about 11th mag in June, to a maximum of about 10.3 mag by the end of July, before starting to fade slightly by September.

MOON PHASES:

1st Qtr: 10th June; Full: 18th June; Last Qtr: 26th May; New: 3rd July, 1st Qtr: 10th July; Full: 18th July; Last Qtr: 25th July; New: 1st Aug. (eclipse); 1st Qtr: 8th Aug.; Full: 16th Aug. (eclipse); Last Qtr: 23rd Aug.; New: 30th Aug.; 1st Qtr: 7th Sept.

LAST MEETING'S TALK

by Gwyneth Hueter

Last month's talk was given by our very own Trevor Pitt and was about weather forecasting for astronomers.

He gave us a quick run-down on types of clouds and their location in the atmosphere, starting with our flat-bottomed cumulonimbus close to the ground and ending with the cirrus which can get above 70,000 feet at the tropics and which gives us noctilucent clouds.

There are six basic weather patterns relevant to the British Isles, and the ones we need to associate with good observing conditions are:

Tropical Maritime: Wind coming from the south west, good in the Summer, especially around East Anglia.

Polar Maritime: Wind from the north-west, good all year round.

Arctic Maritime: Wind from due north, very cold but excellent seeing, winter only.

Returning Polar Maritime: Low pressure area in the Atlantic off the west of the British Isles. The wind comes anticlockwise round it, up from the south-west and brings us good observing conditions in Summer and Autumn.



OZONE, THE GREENHOUSE GAS

We all know that ozone in the stratosphere blocks harmful ultraviolet sunlight, and perhaps some people know that ozone at the Earth's surface is itself harmful, damaging people's lungs and contributing to smog.

But did you know that ozone also acts as a potent greenhouse gas? At middle altitudes between the ground and the stratosphere, ozone captures heat much as carbon dioxide does.

In fact, pound for pound, ozone is about 3000 times stronger as a greenhouse gas than CO₂. So even though there's much less ozone at middle altitudes than CO₂, it still packs a considerable punch. Ozone traps up to one-third as much heat as the better known culprit in climate change.

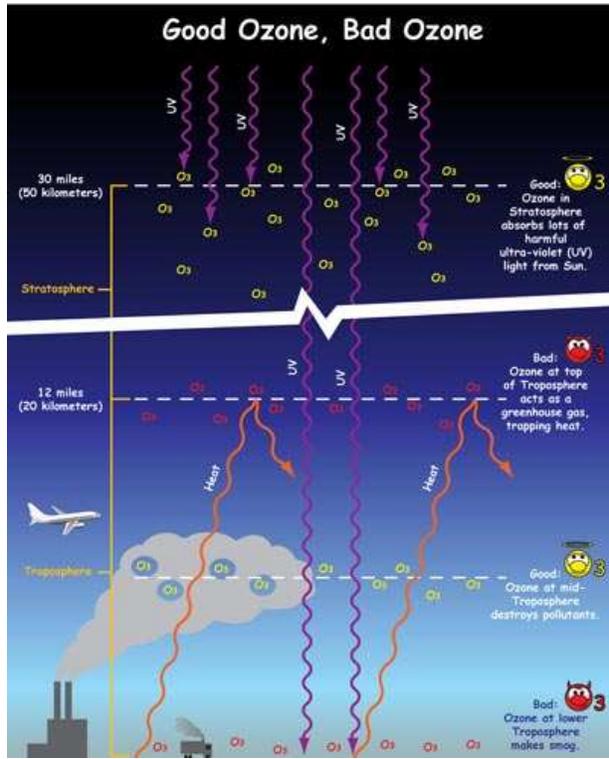
Scientists now have an unprecedented view of this mid-altitude ozone thanks to an instrument aboard NASA's Aura satellite called the Tropospheric Emission Spectrometer—"TES" for short.

Most satellites can measure only the total amount of ozone in a vertical column of air. They can't distinguish between helpful ozone in the stratosphere, harmful ozone at the ground, and heat-trapping ozone in between. By looking sideways toward Earth's horizon, a few satellites have managed to probe the vertical distribution of ozone, but only to the bottom of the stratosphere.

Unlike the others, TES can measure the distribution of ozone all the way down to the heat-trapping middle altitudes. "We see vertical information in ozone that nobody else has measured before from space," says Annmarie Eldering, Deputy Principal Investigator for TES.

The global perspective offered by an orbiting satellite is especially important for ozone. Ozone is highly reactive. It is constantly being created and destroyed by

photochemical reactions in the atmosphere and by lightning. So its concentration varies from region to region, from season to season, and as the wind blows.



Ozone behaves differently at different altitudes in the atmosphere. High in the stratosphere and at mid-troposphere it has positive effects on life at the surface. At the top of the troposphere ozone is a greenhouse gas and at the surface it makes smog.

Data from TES show that ozone's heat-trapping effect is greatest in the spring, when intensifying sunlight and warming temperatures fuel the reactions that generate ozone. Most of ozone's contribution to the greenhouse effect occurs within 45 degrees latitude from the equator.

Increasing industrialization, particularly in the developing world, could lead to an increase in mid-altitude ozone, Eldering says. Cars and coal-fired power plants release air pollutants that later react to produce more ozone.

"There's concern that overall background levels are slowly increasing over time," Eldering says. TES will continue to monitor these trends, she says, keeping a careful eye on ozone, the greenhouse gas.

Learn more about TES and the science of ozone at tes.jpl.nasa.gov/. Kids can get a great introduction to good ozone and bad ozone at: <http://spaceplace.nasa.gov/en/kids/tes/gases>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

PHOTO FROM PERCY

Here is a photograph of Eta Carina from our guest after-tea speaker of a couple of months ago, Percy Amoils from South Africa:



Percy says: "Eta Carina taken tonight (June 8th) using 14 x 5 minutes luminescent frames @ 9 micron pixels binned 2x2 with 4x5 minute red, green and blue frames binned 3x3. 12.5inch @ f9 RCOS with AO-L and SBIG11000, Hutech IDAS LPR filter on Takahashi mount in Sirius dome 1km from Sandton City, [South Africa]. Interesting kaleidoscope of colours and textures in nebula."

FURTHER DISCUSSION

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on <http://groups.yahoo.com/group/abingdonas/>.

To join the abastro list, please go to <http://www.yahogroups.com>. You can also unsubscribe from the list here. To post messages to the list, please send them to abingdonas@yahogroups.com. Please note that you will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at: <http://groups.yahoo.com/group/abingdonas/>.

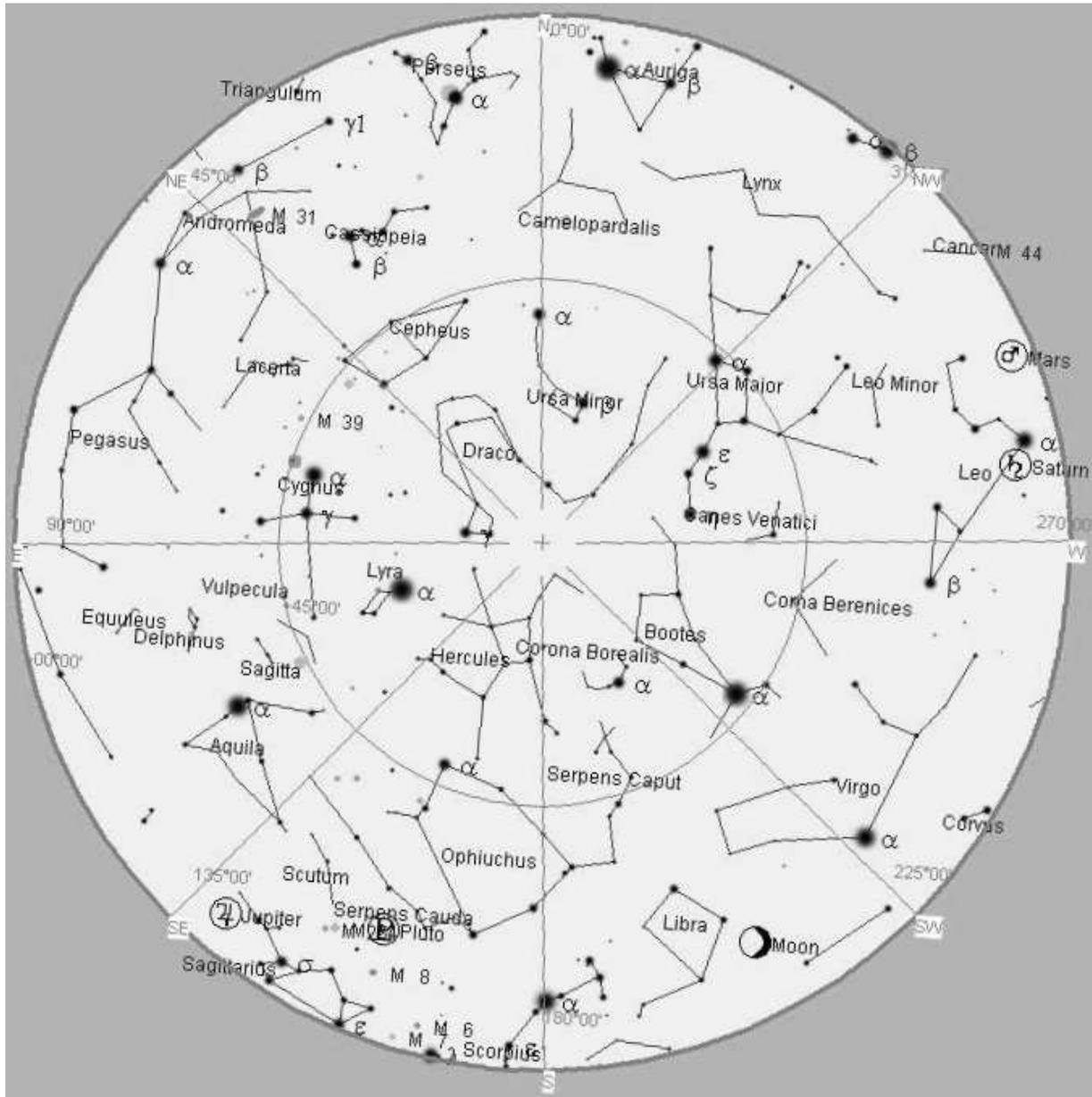
Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the meeting. You are most welcome to join us.

DATES FOR YOUR DIARY

8th Sept. 8pm. First speaker meeting of the new season. See website nearer the date for details.

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to: Mail: A.T.Ramsey, 35 Cope Close, OXFORD, OX2 9AJ. E-mail: AbAstro@ATRamsey.com Phone: 01865 245339

STAR CHART



The Night Sky at midnight (BST) next Saturday night (14th/15th June)

That's how late you'll have to stay up to see a dark sky at this time of the year. The summer triangle of Vega (Lyra), Altair (Aquila) and Deneb (Cygnus) is starting to rise higher to take its place overhead over the summer.