

# SPACEWATCH

the newsletter of the Abingdon Astronomical Society

8<sup>th</sup> November 2010

Dr Frazer Pearce  
(University of Nottingham),  
'Exoplanets'

How many of you look up at all those stars in the night sky and wonder how many of them have planets orbiting round them like our Sun? How many of you think of all those stars as suns to other planets? Dr Frazer Pearce is here tonight to tell us about those planets that have been discovered around other suns, and quite possibly about those that haven't yet been discovered, perhaps like a small rocky planet in the habitable zone of another distant star, in a small town on which a group of aliens are just sitting down to a lecture – about us!

## THE NIGHT SKY THIS MONTH

by Bob Dryden

**Mercury:** While technically an evening object, Mercury will be very difficult to see as it is barely 5° above the horizon at sunset throughout this apparition. For the record though, greatest eastern elongation occurs on 1<sup>st</sup> December when the planet is 21° from the Sun. Maybe your best opportunity to spot Mercury will be 7<sup>th</sup> December when the slim crescent Moon will be just above, and to the left of it. You will need a clear western horizon and a pair of binoculars as the planet will shine at magnitude 0.0, and will be in bright twilight. If you can get a telescope on to Mercury, the crescent shape should be obvious.

**Venus:** Now in the morning sky, the solar elongation increases from 18° to 42° this session which means Venus will be increasingly easy to see as the weeks pass. On 8<sup>th</sup> November the planet is about 10° high at sunrise, which increases to 25° by 13<sup>th</sup> December. While this might not seem very high, Venus blazes at magnitude -4.5 enabling you to find it easily, even against a twilight sky. The telescopic view will be glorious as you will see a thin crescent, which increase in size as we approach December. The morning of 2<sup>nd</sup> December has the crescent Moon to the right of Venus, which will be a nice sight to start the day with.

**Mars:** Still in the evening sky, but extremely near to the horizon, and quite faint now (mag. +1.3), Mars is as good as out of sight this session.

**Jupiter:** Shining at a bright magnitude -2.5 in Aquarius, Jupiter is the very bright 'star' you can see towards the south as darkness falls. It is very well placed for extended observation, and you can see the cloud bands rotate across the disc given a bit of time. By plotting the positions of the four bright moons, you can also see them change positions if you check back every hour or so.

At the moment, the South Equatorial Belt is missing (it faded away a couple of months ago) and its return is eagerly awaited by astronomers, so keep an eye out for this. Presently, the Great Red Spot seems to be slightly more obvious than usual so this is something else you can be looking for.

**Saturn:** Another morning object now following its recent conjunction with the Sun, Saturn is slowly climbing away from the morning twilight. It rises about 04.00 UT on 8<sup>th</sup> November, and by 13<sup>th</sup> December, this has become 02.00 UT. Still in Virgo, and shining at magnitude +0.9, you will need to look towards the south east. The rings open up slightly during this session, going from +8.6° to +9.7°, so any small telescope will show them to you. If the seeing is good enough, you might be able to see the shadow of Saturn's globe cast on to the rings as the geometry is right for this at the moment.

**Uranus + Neptune:** Uranus is in Pisces, just to the left of Jupiter so it is relatively easy to find. At magnitude +5.7, binoculars are all you need to see it. Neptune is further west, in Capricornus, shining at magnitude +7.8. There is a 5<sup>th</sup> magnitude star, 51 Capricornus, very close to Neptune this session which you can use as a useful guide. Neptune is creeping closer towards the evening twilight so make the most of any clear nights to look for the planet before it is lost for another year.

**Meteors:** The Taurid shower is still active, although the maximum has just passed. Taurid meteors are still visible until 30<sup>th</sup> November, but there will only be a small number per hour. However, they are often bright and slow, which means you notice them more easily.

The Leonids are active from 15<sup>th</sup> to 20<sup>th</sup> November and they have a hourly rate of about of 20. However, the night of maximum, 18<sup>th</sup>, there is an 11 day old bright, gibbous Moon in the sky. The Moon sets at about 04.00 UT which gives you a couple of hours of dark sky in which to look for the Leonid meteors.

Probably the best meteor shower of the year is currently the Geminids, and they are visible between 7<sup>th</sup> and 16<sup>th</sup> December. Maximum is 14<sup>th</sup> December at 06.00 UT, and under perfect conditions you can expect about 100 meteors an hour. There is an 8 day old First Quarter Moon that night which sets at about midnight. This gives you the rest of the night to watch for meteors, and as the maximum is at 06.00UT, just before dawn should be the prime time to see them.

**Comets:** While comet 103P/Hartley was rather disappointing visually, it can still be found crossing Monoceros and Puppis. It will fade from mag. +5.7 to mag. +8.3 according to predictions. However, as it was slightly fainter than initial predictions, it will probably be

fainter than this. You will have to wait until after midnight for the comet to rise, but you should still be able to see it in a telescope.

**Occultations:** On the evening of 16<sup>th</sup> November at 19.47 UT, the magnitude +4.4 star, 19 Pisces, is covered by the gibbous Moon. They will be about 40° high in the south at the time.

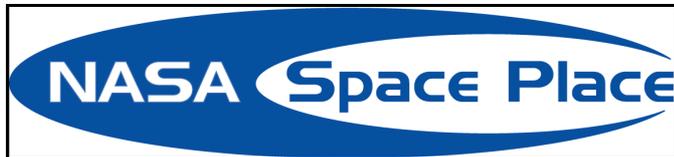
A more unsociable occultation occurs on the morning of 24<sup>th</sup> November when the +4.3 star, 1 Gemini reappears from behind the dark limb of the waning gibbous Moon. This happens at 04.05 UT, and they will be about 50° high in the south west.

**Asteroids:** The asteroid 6 Hebe is still about, although it fades slightly from mag. +8.5 to mag. +9.1 by mid December. It is still crossing Cetus so is visible for a good part of the night.

Asteroid 7 Iris is brightening now as it moves amongst the stars of Cancer. It goes from mag. +9.3 in November, to mag. +8.8 in December and will continue to get brighter as we approach Christmas. Iris is just below the Beehive star cluster which is easy to see find in binoculars, and is visible to the naked eye if you have a fairly dark sky.

### MOON PHASES:

New: 6<sup>th</sup> Nov.; First Qtr: 13<sup>th</sup> Nov.; Full: 21<sup>st</sup> Nov.; Last Qtr: 28<sup>th</sup> Nov.; New: 5<sup>th</sup> Dec.; First Qtr: 13<sup>th</sup> Dec.



### CLOSE ENCOUNTERS WITH JUPITER

by Dr Tony Philips

Jupiter and Earth just had a close encounter—and it was a good one. In late September 2010, the two worlds were 31 million km (about 19 million miles) closer than at any time in the past 11 years. Soaring high in the midnight sky, Jupiter shone six times brighter than Sirius and looked absolutely dynamite through a backyard telescope.

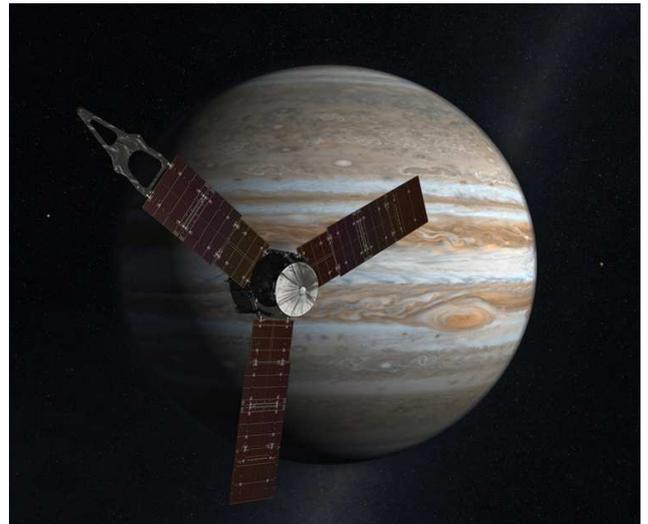
Planetary scientist Scott Bolton of the Southwest Research Institute isn't satisfied. "I'd like to get even closer," he says.

Bolton will get his wish in July 2016. That's when a NASA spacecraft named "Juno" arrives at Jupiter for a truly close-up look at the giant planet. Swooping as low as 5,000 km (about 3,000 miles) above the cloud tops, Juno will spend a full year orbiting nearer to Jupiter than any previous spacecraft.

The goal of the mission is to learn what lies inside the planet.

Astronomers have been studying Jupiter since the invention of the telescope 400 years ago, but in all that time the planet's vast interior has remained hidden from view. Even the Galileo

probe, which dived into the clouds in 1995, penetrated no more than about 0.1% of Jupiter's radius.



*The Juno mission, arriving at Jupiter in July 2016, will help to solve the mystery of what's inside the giant planet's core.*

"Our knowledge of Jupiter is truly skin deep," says Bolton, Juno's principal investigator. "There are many basic things we just don't know—like how far down does the Great Red Spot go? And does Jupiter have a heavy core?"

Juno will improve the situation without actually diving into the clouds. Bolton explains how. "Juno will spend a full year in close polar orbit around Jupiter, flying over all latitudes and longitudes. We will thus be able to fully map Jupiter's gravitational field and figure out how the interior is structured."

But that's not all. Researchers have good reason to believe that much of Jupiter's interior is filled with liquid metallic hydrogen, an exotic metal that could form only in the high-pressure, hydrogen-rich core of a giant planet. Jupiter's powerful magnetic field almost certainly springs from dynamo action inside this vast realm of electrically conducting metal.

"Juno's magnetometers will precisely map Jupiter's magnetic field," says Bolton. "This map will tell us a great deal about planet's inner magnetic dynamo—what it's made of and how it works."

Finally, Juno will probe Jupiter's atmosphere using a set of microwave radiometers. "Our sensors can measure the temperature 50 times deeper than ever before," says Bolton. Researchers will use that information to figure out how much water is underneath Jupiter's clouds. "Microwave measurements of Jupiter's water content are particularly exciting because they will help discriminate among competing theories of the planet's origin."

Now *that's* a close encounter. Stay tuned for Juno.

Find out more about the Juno mission at [http://www.nasa.gov/mission\\_pages/juno](http://www.nasa.gov/mission_pages/juno). Play the new

Solar System Explorer super game, which includes the Juno Recall mini-game at <http://spaceplace.nasa.gov/en/kids/solar-system>. It's not just for kids!

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

## LAST MONTH'S TALK

by Gwyneth Hueter

Last month's talk was given by Dr. Barry Kellett of RAL, SMART-1, Europe's first mission to the Moon.

This was a budget-priced (as these things go) attempt to send an X-ray imager to the Moon. (hence Small Missions for Advanced Research in Technology = SMART) Power was cleverly created by using an ion drive using ionized xenon, as part of the experiment to use as little power as possible. It was the first step in a plan to send a craft to Mercury (the Bepi-Colombo mission).

It took sixteen months and many Earth orbits before SMART-1 was captured by the Moon's gravity. (Launched in September 2003 and started operating November 2005) The X-ray camera was called D-CIXS (Demonstration of a Compact Imaging, X-ray Spectrometer) and it looked like a toaster with 24 squares on one side (the X-ray sensors. SMART-1 itself looked like a large washing machine!). Once in orbit round the Moon it was able to capture solar X-rays being bounced off the lunar surface. The X-rays also cause fluorescence in the Earth's atmosphere, namely, the main rock-forming elements (magnesium, aluminium and silicon). It turned out that the Moon emits occasional X-rays, which was rather unexpected.

Dr Kellett ended by spending considerable time describing the follow-up trip with the much larger Chandrayaan-1 X-ray Spectrometer (C1XS), which started producing results in January 2009 for nine months, although low solar activity spoilt its act somewhat.

## 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 abingdonas 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](mailto: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 main meetings. You are most welcome to join us.

## DATES FOR YOUR DIARY

**15<sup>th</sup> Nov.** 8pm Beginners' Meeting in the Perry Room.

**29<sup>th</sup> Nov. – 1<sup>st</sup> Dec. (FCN)** 8pm Observing Evening at Frilford Heath. Ring Ian on the night to confirm on 07817 687627. [FCN=*first clear night*]

**6<sup>th</sup> Dec.** 8pm Beginners' Meeting in the Perry Room.

**13<sup>th</sup> Dec.** 8pm *Stan Cocking Memorial Lecture:* Dr Arfon Smith, (Univ. Oxford), 'Galaxy Zoo'

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

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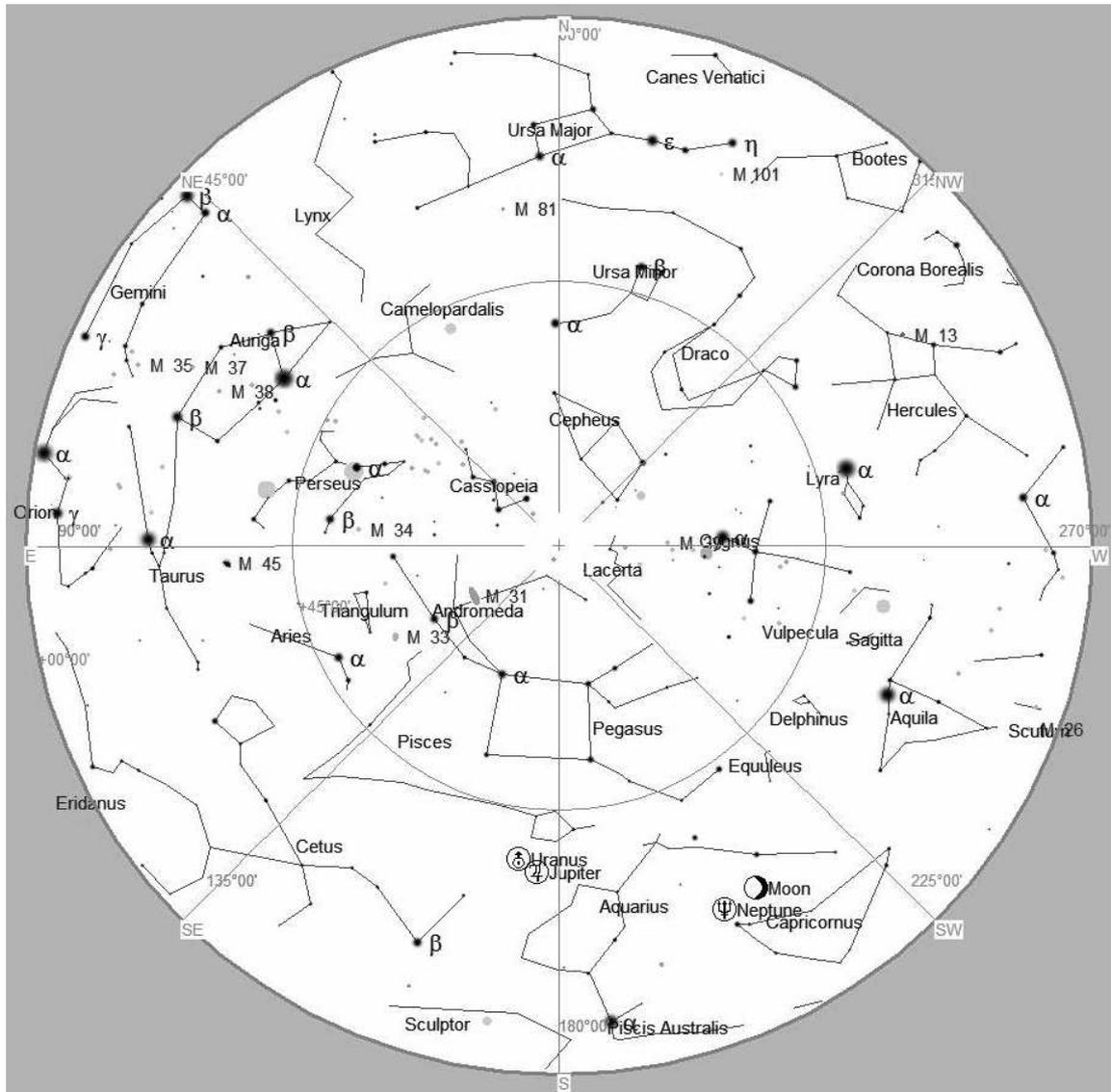
Phone: 01865 245339



*Jupiter, by society member Clifford Marcus.*

This photograph was taken in September through a Meade LX 10 8" SCT with a 2x Televue Barlow using Philips Toucam 900 frames stacked Registax. The Great Red Spot is clearly visible.

## STAR CHART



**The Night Sky at 21:00pm (GMT) next Saturday (13<sup>th</sup> November)**

The Square of Pegasus is high up due south at this time. Through a pair of binoculars, from the top-left star of the Square, move two stars left and then two stars up towards the zenith. There you will see a fuzzy patch. If you're lucky enough to be in a dark sky, you will be able to see it with your naked eye. This is M31, the Great Spiral of Andromeda, the furthest naked-eye object in the sky – 2.2 million light-years away. It is the nearest large galaxy to our own galaxy, the Milky Way, and slightly larger than our own. Photographs reveal millions of stars in a flattened spiral shape.

You can't fail to miss brilliant Jupiter, almost due south. A small telescope will reveal its four major satellites (see below). Uranus is nearby and you could try looking for this in a small telescope. Neptune is near the crescent Moon in the south-west but you will need a larger 'scope to see this faint planet.



*Jupiter and its satellites at 9pm GMT on Saturday 13<sup>th</sup> November, 2010.*

Now turn north – the Plough is low down and looking rather large because of this. The two pointers point directly upwards to Polaris, the pole star.