

# SPACEWATCH

the newsletter of the Abingdon Astronomical Society

**10<sup>th</sup> November 2014**  
**Professor Richard Harrison (RAL):**  
**'STEREO'**

## THE NIGHT SKY THIS MONTH

by Bob Dryden

**Mercury:** Following Inferior Conjunction on 16th October Mercury moves in to the morning sky, reaching Greatest Elongation on 1st November (at 19°). This is a good apparition, with Mercury crossing the constellation of Virgo. The little planet should be visible around the third week of October, and by 1st November it rises nearly 2 hours before the Sun and reaches an altitude of 12° by sunrise. By then it will be shining at -0.7 magnitude meaning it will be an easy naked eye target low in the south east. Even by the end of this session, Mercury will still reach 12° above the horizon by sunrise. On 5th November Mercury will be a couple of degrees east of the first magnitude star Spica.

**Venus:** With Venus reaching Superior Conjunction on 25th October, you will struggle to see it during this session.

**Mars:** Mars continues to hover low in the south west, moving from Sagittarius on 21st October. While not overly bright at +0.8/+1.0 magnitude, never the less, remains an easy naked eye object after sunset. The apparent size of the disc however decreases to just 5.3" by mid November so telescopic views will be rather poor.

In mid October the planet is 12° high at sunset just past the south, and sets approximately 2 hours after the Sun. By the time we reach mid November, things have hardly changed although by then Mars sets nearly 2.5 hours after the Sun.

**Jupiter:** Available in the morning sky, Jupiter shines at a brilliant -2.0 magnitude so it is not difficult to find as it crosses Leo (it enters Leo on 14th October). It starts the session rising around 01.30 UT which is nearly 6 hours before the sunrise. By sunrise the planet is 50° above the horizon so the telescopic views will be good. Come mid November Jupiter rises by 23.00 UT and reaches culmination just before dawn.

On 18th October the large crescent Moon will be 5° west of Jupiter.

**Saturn:** Currently in the constellation of Libra, Saturn is heading towards solar conjunction in mid November. However, if you are keen, you should just be able to see it until the end of October very low in the south west. It starts this session setting about an hour after the Sun but by the end of October this has become just 30 minutes by which time Saturn will be lost in the solar glare.

The rings are at an angle of 23° but at such a low altitude (below 10° and decreasing all the time) the telescopic views will probably be very poor! That Saturn is shining at a relatively bright +0.6 magnitude, but even this will not be bright enough for you to find the planet by the time November begins.

**Uranus & Neptune:** Uranus is well placed now for observations over most of the night. Having past opposition just a few days ago, the planet is visible low in the

south east, in Pisces, as the Sun sets. It reaches the meridian around 22.00 UT at an altitude of just over 40° and sets as the Sun rises.

By mid November it is culminating by 22.00 UT. At +5.9 magnitude you will actually see it as a 'star' in binoculars but you will need a telescope to get it into a disc.

Neptune is further west in Aquarius and is fainter at +7.8 magnitude but is still visible in binoculars if you know where to look. As Neptune is in Aquarius, it culminates earlier than Uranus, at approximately 21.00 UT in October, and about 19.00 UT by mid November. It is also lower than Uranus, only reaching an altitude of 30° by the time it is in the south. By mid November the planet is setting by 01.00 UT.

**Meteors:** There are two decent active meteor showers this session. From 16th to 30th October the Orionid meteor shower can be seen, with a maximum occurring during the period 21st to 24th. Although it has a low hourly rate of 25 meteors, the Moon is just a thin crescent in the sky this year so the meteors should be easily visible.

The other meteor shower is the Taurids which can be seen between 1st October and 30th November. This shower has two maxima, one on 12th November and one on 12th November. Unfortunately, during the two maxima, the Moon is either Full, or close to Full, phase so seeing meteors will be compromised by the very bright moonlight. On top of that, the Taurid hourly rate is quite poor at just 10 meteors. However, the few meteors that occur are often very bright and you often notice them while looking for other objects.

**Occultations:** There are two occultations of reasonably bright stars this session. The first is the occultation of a planet. The planet in question is Saturn, and the Moon occults the ringed planet on 25th October at 16.06 UT. Obviously, at 16.06 it is still daylight which makes seeing the event rather hard. To add to the difficulty, the Moon is only a two day old crescent so will also be hard to see as well. Things will be of course if you have a GoTo telescope (you will definitely need a tracking system of some kind to see anything).

As the Sun will still be above the horizon, take great care to ensure you do not accidentally point your telescope anywhere near it.

At the time of occultation, the Moon will be 18° high in the south west and will reappear from behind the Moon at 17.07 UT by which time the planet will be at an altitude of 12°.

This will be a very difficult event to observe, but if you like a challenge, give it a try. On 30th October, Beta Capricornus will be occulted by the First Quarter Moon at 22.00 UT. The +3.1 magnitude star will be just 3° above the southern horizon at the time.

The final occultation occurs on 5th November at 17.05 UT. +4.3 magnitude Omicron Pisces is the star involved and will be approximately 12° above the horizon in the east. There will be a lot of twilight at this time but the Moon is nearly Full so you will still be able to see it easily enough.

**Asteroids:** There are just two asteroids to mention this time and both are faint! It will help if you have a 3 inch telescope. 3 Juno brightens slightly from +9.5 magnitude to +9.2 magnitude (at +8.5 mag. by the end of the year). It starts in Cancer and moves in to Eridanus on 15th October.

6 Hebe is also brightening, going from +8.5 magnitude in October to +8.0 magnitude (which will be its brightest this apparition) in November. The asteroid can be found in Eridanus (just south of Taurus).

Comets: If you have a clear southern horizon you might like to try C/2013 A1 Siding Springs which is moving through Ophiuchus before offering a brief apparition on 2nd November. It starts at +8.3 magnitude but is fading and reaches +9.1 by mid November. The comet will be low in the south west, setting quickly after the Sun in October but staying visible slightly longer by November as it gains height. Unfortunately, the increase in altitude is countered by the comet fading.

**MOON PHASES:**

Last Qtr 16<sup>th</sup> Oct; New: 23<sup>rd</sup> Oct.; First Qtr: 31<sup>st</sup>; Full: 6<sup>th</sup> Nov.; First Qtr: 14<sup>th</sup> Nov.

**LAST MONTH'S TALK**

by Gwyneth Hueter

For those of you who missed the last two talks, June 2014's meeting saw us graced by Newbury AS member Richard Fleet, whose talk was on DIY telescopes.

The enthusiasm of the man and his determination on getting his home made telescopes right is the hallmark of the true amateur, although it did help that he was under the excellent skies of what is now Zimbabwe in his early days of telescope making.

If you want to have a go, some useful points are:

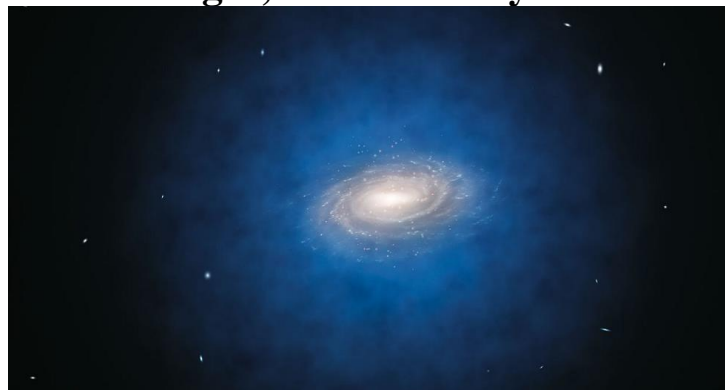
- James Muirden has a good book on the subject.
- Richard managed to grind a 22cm blank into an f8 focal length ready to polish in 90 minutes.
- Stick to smaller mirrors with long focal lengths; short focal lengths and larger mirrors have a much smaller margin of error. His biggest effort was a 52cm - over 20 inches.
- Jean Texereau is another name to google for telescope making.
- The mirror tube must be bigger than the mirror, otherwise you get turbulence inside. A really good width for a tube is twice the width of the mirror.
- Dobsonian mounts can be made lightweight and firm: the base components can be made as frames with crosspieces instead of heavy slabs. He also made a turntable running on 96 ball bearings!
- You can get a fairly thin mirror to keep its shape if it sits in a frame with six flotation points.

Last month's talk (September 2014) was another lifesaving event (our intended speaker ended up at the wrong church hall) conducted by our own Owen Brazell, who gave us an introduction to our local family of

galaxies. The two main members of the Local Group are M31 and us (the Milky Way!). There is a lot of other galaxies orbiting around us – various irregular galaxies and lots of odd dwarf galaxies, some of which look like open clusters. There is even the globular M54, which is the remnant of a Sagittarius dwarf galaxy. The largest of the smaller members that we can see is the lovely spiral M33, which is nearer to M31 than it is to us.

In 4.5 billion years M31 and the Milky Way will interact.

**Dark Matter Half What We Thought, Scientists Say**



A new measurement of dark matter in the Milky Way has revealed there is half as much of the mysterious substance as previously thought. Australian astronomers used a method developed almost 100 years ago to discover that the weight of dark matter in our own galaxy is 800 billion times the mass of the Sun. They probed the edge of the Milky Way, looking closely, for the first time, at the fringes of the galaxy about 5 million trillion kilometres from Earth. Astrophysicist Dr Prajwal Kafle, from The University of Western Australia node of the International Centre for Radio Astronomy Research, said we have known for a while that most of the Universe is hidden. “Stars, dust, you and me, all the things that we see, only make up about 4 per cent of the entire Universe,” he said. “About 25 per cent is dark matter and the rest is dark energy.”

Dr Kafle, who is originally from Nepal, was able to measure the mass of the dark matter in the Milky Way by studying the speed of stars throughout the galaxy, including the edges, which had never been studied to this detail before.

He used a robust technique developed by British astronomer James Jeans in 1915 — decades before the discovery of dark matter.

Dr Kafle's measurement helps to solve a mystery that has been haunting theorists for almost two decades.

"The current idea of galaxy formation and evolution, called the Lambda Cold Dark Matter theory, predicts that there should be a handful of big satellite galaxies around the Milky Way that are visible with the naked eye, but we don't see that," Dr Kafle said.

"When you use our measurement of the mass of the dark matter the theory predicts that there should only be three satellite galaxies out there, which is exactly what we see; the Large Magellanic Cloud, the Small Magellanic Cloud and the Sagittarius Dwarf Galaxy."

University of Sydney astrophysicist Professor Geraint Lewis, who was also involved in the research, said the missing satellite problem had been "a thorn in the cosmological side for almost 15 years."

"Dr Kafle's work has shown that it might not be as bad as everyone thought, although there are still problems to overcome," he said.

The study also presented a holistic model of the Milky Way, which allowed the scientists to measure several interesting things such as the speed required to leave the galaxy.

"Be prepared to hit 550 kilometres per second if you want to escape the gravitational clutches of our galaxy," Dr Kafle said.

"A rocket launched from Earth needs just 11 kilometres per second to leave its surface, which is already about 300 times faster than the maximum Australian speed limit in a car!"

ICRAR is a joint venture between Curtin University and The University of Western Australia with support and funding from the State Government of Western Australia.

Dr Prajwal Kafle conducted this research at both the University of Sydney and the International Centre for Radio Astronomy Research at The University of Western Australia.

## FURTHER DISCUSSION

Why not take a look at our website? It's at: [www.abingdonastro.org.uk](http://www.abingdonastro.org.uk) .

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.

## DATE FOR YOUR DIARY

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

**20<sup>th</sup> -23<sup>rd</sup> Oct. (FCN)** 8pm Observing evening at White Horse Hill. Ring Ian on 07557 373401 first to confirm. [FCN = first clear night]

The editor of "SpaceWatch" is Owen Brazell, who would very much appreciate your stories & contributions. In particular whilst many fine images are being posted oin the discussion group it would be nice to have some in the SpaceWatch. Please send any news, observations, photos, etc. to:

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# STAR CHART

The night sky at 10 pm (BST) on Monday 20<sup>th</sup> October 2014

