SPACEWATCH

the newsletter of the Abingdon Astronomical Society

14th May 2012

Annual General Meeting
followed by a talk by Dr Sarah Roberts,
Operations Manager of:
'The Faulkes Telescope'

Tonight is our AGM, or should I say "your AGM" as it is your turn to make decisions about how your society is run, or to volunteer to help run it yourself.

After the AGM, which won't take long (I think 18 minutes was our recent record), we have a talk by Dr Sarah Roberts about the Faulkes Telescope which give those of you without large telescopes or dark skies (so that's most of us then) access to deep sky views.

THE NIGHT SKY THIS MONTH

by Bob Dryden

There really is only one event to start this session with and that, of course, is the transit of Venus on the morning of 6th June. OK, to see this you are going to have to get up early, but as the next one is not until 2117 I think you should really make the effort. If you missed the last one in 2004 then this is definitely a 'once-in-a-lifetime' occurrence. Sadly, we cannot see the whole transit from the UK as it begins well before the Sun rises at 03.45 UT (04.45 BST). Once you can see the Sun, by using suitable safe filters you will easily be able to see a big black 'dot' in the western half of the solar disc. That 'dot' is Venus and it will slowly move towards the western limb over the next hour. At 04.37 UT the edge of Venus will touch the solar limb (known as third contact), and at 04.55 UT fourth contact is reached which is the moment Venus completely leaves the Sun's disc and the transit is over for another 105 years. Make sure you have a fairly clear eastern horizon because the Sun is barely 7° high at fourth contact. Let's all just hope it is clear that morning.

Mercury: As this session begins Mercury is heading towards Superior Conjunction with the Sun on 27th May so is out of view until late into the first week of June. Then the planet will be visible in the evening sky but very low down in the west. By the beginning of the second week of June Mercury will be about 10° above the horizon at sunset and will take about an hour to set itself. Shining at magnitude -0.7 at this time, binoculars are all you should need to find it as long as you look early enough.

Venus: Although the transit is taking centre stage, the planet will be on view in the evening sky until the end of May. A telescope will show you a very pretty thin crescent phase – in fact, steadily held binoculars will probably do the same thing as the Venusian disc is 45″ across. In mid-May Venus still takes 3 hours to set after the Sun, but this quickly diminishes until by the end of the month the planet sets just less than hour after the Sun. On the evening of 22nd May there will be a nice crescent Moon just below Venus against the twilight sky which I always think looks fabulous.

Mars: Still moving across Leo, Mars continues to fade slightly as Earth pulls away from it. Starting the session at magnitude +0.2, Mars reaches magnitude +0.7 by mid-June – but this still puts it well within naked eye visibility. Telescopically the planet is diminishing in size, reaching 7″ across by mid-June so the apparition is coming to an end soon (5″ across is considered to be the point at which surface detail is too hard to see). Equally, Mars is in the south at sunset in mid-May but by mid-June it is in the south west at an altitude of 35°. A low altitude and a small disc diameter means this is probably your last chance to have a decent view of the red planet this apparition.

Jupiter: Jupiter was in conjunction with the Sun on 13th May and so will be out of view for a few weeks. By 11th June you may pick it out of the morning twilight when it will be 10° high at sunrise in the constellation of Taurus.

Saturn: Still in the constellation of Virgo, Saturn is already fairly high in the south east at sunset in mid-May. This gives you many hours of potential observing time as the planet does not set until about 04.00 BST. At approximately magnitude +0.5 it is very easy to see just above the first magnitude star Spica. The rings are at an angle of 13° so they are easily visible in a telescope. On the evening of 31st May Saturn, Spica, and the Moon form a nice little grouping.

Uranus & Neptune: Both of these planets are on view in the morning sky at the moment with Neptune being the better placed of the two. Uranus is on the Pisces/Cetus border and so is closer to the Sun than Neptune. Still, by June 11th Uranus will be 25° above the south eastern horizon by sunrise so you should be able to find it in binoculars shining at magnitude +5.7. Neptune resides in Aquarius and will be further from the morning twilight, over in the south, giving you longer to find it. Shining at magnitude +7.8, you will need binoculars and a finder chart to track it down.

Comets: The only comet above 10th magnitude predicted to be viewable is our very old friend comet 2009 P1 Garradd. Even this one though is about to leave us as by mid-June it will have decreased to +10.3 magnitude. However, in mid-May it is still a brighter magnitude +9.4 crossing Cancer and a small telescope should enable you to find it.

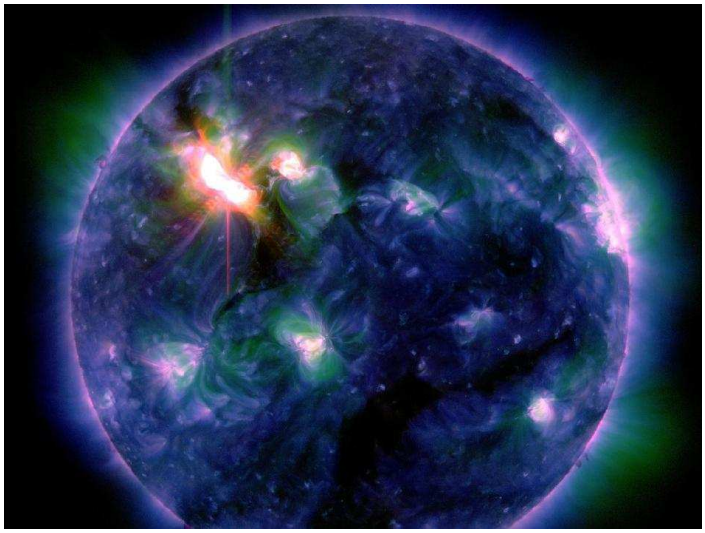
MOON PHASES:

New: 20th May; First Qtr: 28th May; Full: 4th June; Last Qtr: 11th June.

THANK GOODNESS FOR MAGNETISM

by Dr Tony Phillips

Only 93 million miles from Earth, a certain G-type star is beginning to act up.



Every 11 years or so, the solar cycle brings a period of high solar activity. Giant islands of magnetism—"sunspots"—break through the stellar surface in increasing numbers. Sometimes they erupt like a billion atomic bombs going off at once, producing intense flares of X-rays and UV radiation, and hurling massive clouds of plasma toward Earth.

This is happening right now. Only a few years ago the Sun was in a state of deep quiet, but as 2012 unfolds, the pendulum is swinging. Strong flares are becoming commonplace as sunspots once again pepper the solar disk. Fortunately, Earth is defended from solar storms by a strong, global magnetic field.

In March 2012, those defenses were tested.

At the very beginning of the month, a remarkable sunspot appeared on the Sun's eastern limb. AR1429, as experts called it, was an angry-looking region almost as wide as the planet Jupiter. Almost as soon as it appeared, it began to erupt. During the period March 2nd to 15th, it rotated across the solar disk and fired off more than 50 flares. Three of those eruptions were X-class flares, the most powerful kind.

As the eruptions continued almost non-stop, Earth's magnetic field was buffeted by coronal mass ejections or "CMEs." One of those clouds hit Earth's magnetosphere so hard, our planet's magnetic field was sharply compressed, leaving geosynchronous satellites on the outside looking in. For a while, the spacecraft were directly exposed to solar wind plasma.

Charged particles propelled by the blasts swirled around Earth, producing the strongest radiation storm in almost 10 years. When those particles rained down on the upper atmosphere, they dumped enough energy in three days alone (March 7-10) to power every residence in New York City for two years. Bright auroras circled both poles, and Northern Lights spilled across the Canadian border into the lower 48 states. Luminous sheets of red and green were sighted as far south as Nebraska.

When all was said and done, the defenses held—no harm done.

This wasn't the strongest solar storm in recorded history—not by a long shot. That distinction goes to the Carrington Event of September 1859 when geomagnetic activity set telegraph offices on fire and sparked auroras over Mexico, Florida, and Tahiti. Even with that in mind, however, March 2012 was remarkable

It makes you wonder, what if? What if Earth didn't have a magnetic field to fend off CMEs and deflect the most energetic particles from the Sun.

The answer might lie on Mars. The red planet has no global magnetic field and as a result its atmosphere has been stripped away over time by CMEs and other gusts of solar wind. At least that's what many researchers believe. Today, Mars is a desiccated and apparently lifeless wasteland.

Only 93 million miles from Earth, a G-type star is acting up. Thank goodness for magnetism.

With your inner and outer children, read, watch, and listen in to "Super Star Meets the Plucky Planet," a rhyming and animated conversation between the Sun and Earth, at http://spaceplace.nasa.gov/story-superstar.

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

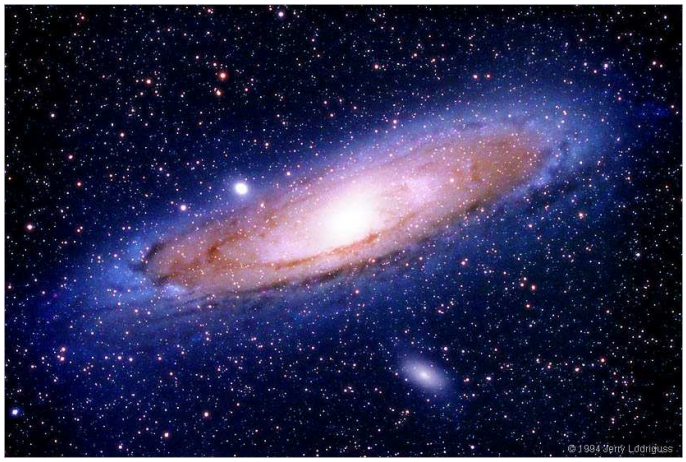
You know how it is, you settle down to get something done on your computer and you get side-tracked by something someone mentioned.

'Weighing the Milky Way' was last month's talk, given by Dr Phil Marshall, a cosmologist at Oxford University. He made a couple of references to websites of interest. I made the 'mistake' of looking up Axel Mellinger's Milky Way composite. It's basically a star atlas you can browse and zoom in on. Much recommended, as you can hunt out

named deep sky objects and perfect your starhopping techniques before you go out in the cold. It is excellent, but it's no good for cheats because you need to know your constellations to get the best out of it.

Dr Marshall was one of the University's Stargazing Live public event organisers. His talk was about using models of galaxies to work out the weight of the Milky Way. These models are how we understand everything, what I understand as concepts. The models are based on the spectra of over one million (real!) galaxies found in the Sloan Sky Digital Survey (SDSS), which was done by a camera on a 2.5m telescope in New Mexico.

The concept of a galaxy is now understood to include a large halo of dark matter surrounding the disc and central bulge - thanks to Vera Rubin, who in 1975 measured the speeds of stars orbiting at differing distances from the centre of M31, and who found that they were moving so fast that there had to be a lot of invisible matter in M31, keeping them in check. As well as guessing about dark matter haloes, there are also the effects of satellite galaxies. So, when it comes to weighing our Milky Way, we can look at our Magellanic clouds again (so passionately discussed in February's talk), to see how the Milky Way's gravity affects them.



What Dr Marshall's team have done is to create a simplified model of the universe including only the important things. So out goes matter, and all those complicated interactions it has, and what remains is a model of the dark matter distribution in an expanding universe. Dark matter is simple to model as it only interacts via gravity. So by modelling the early universe as a random distribution (cloud) of dark matter one can run a model forward 13.5 billion years to the future to see what the distribution of dark matter (and hence those minor components of the universe like matter which cling to it, also via gravity) and see what the universe today might look like.

The SDSS information also enables a model of the present galaxy distribution in the universe to be made. Also models of galaxies with satellite galaxies are created. Dr Marshall told us that the technology to do this has only become available in the last year. The distributions are very similar, at least qualitatively – that is, they look alike.

By examining their model, Dr Marshall found 26,000 galaxies of similar size to the Milky Way that also happened to have two satellite galaxies. By choosing those whose satellites were of similar distances away and travelling at similar speeds to those of our Magellanic Clouds, he could find a galaxy typical of the Milky Way. By running the model backwards from the present, he could see where these satellites came from and how long they have been with us.

It was difficult to work out when he was talking about real galaxies or just the models, but the long and short of it is that the speeds and distances of the Small and Large Magellanic Clouds in relation to the Milky Way gives an approximate mass of 1.2 x 10^{12} Solar masses for our galaxy. He also concludes that the LMC and SMC were captured by the Milky Way and that they arrived together perhaps within the last billion years.

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.yahoogroups.com . You can also unsubscribe from the list here.

To post messages to the list, please send them to abingdonas@yahoogroups.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

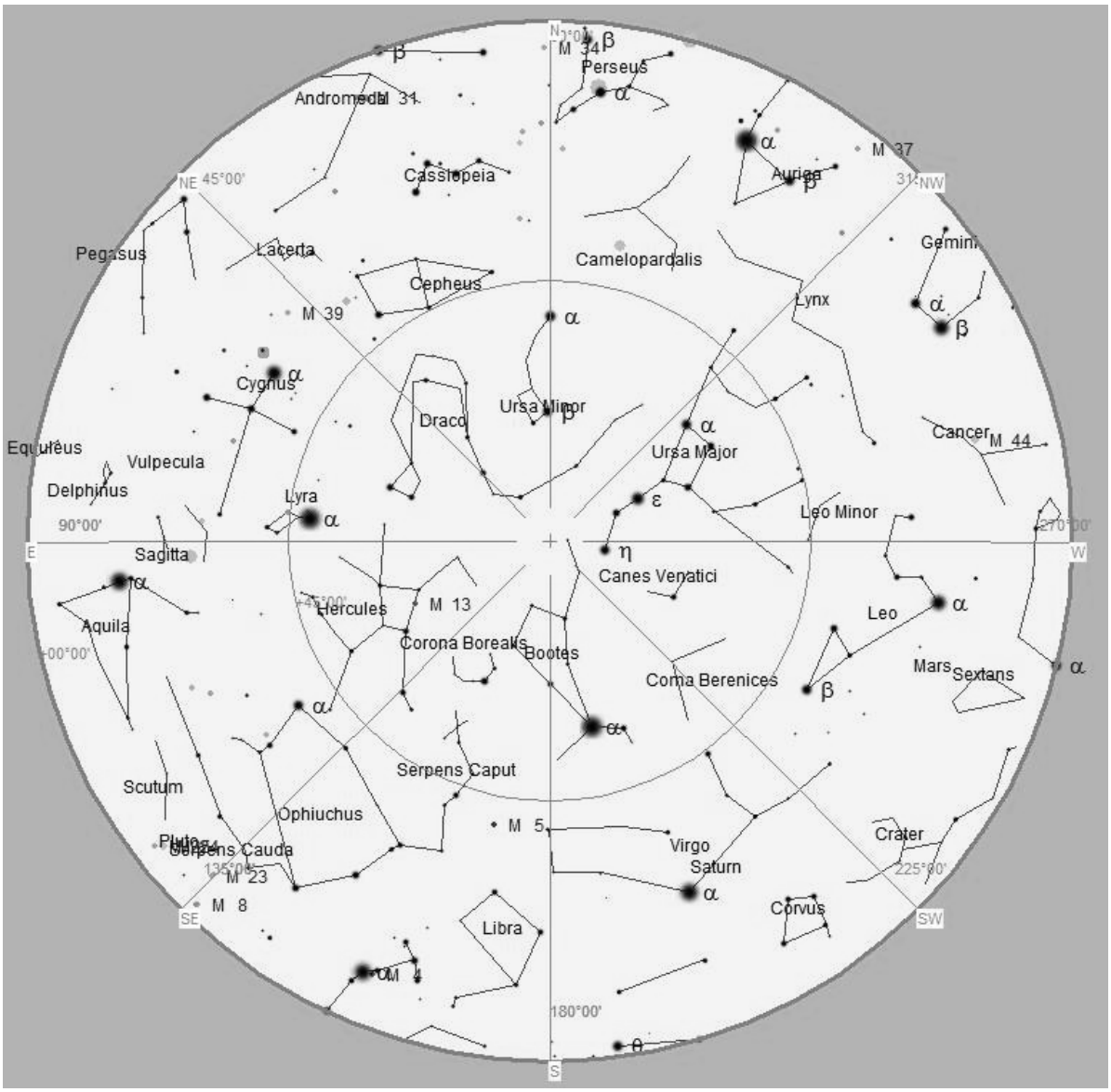
28th May 8pm Beginners' Meeting in the main hall.

11th June 8pm Talk by Dr Rhodri Evans (Univ. Cardiff), "Astronomy from a Boeing 747"

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, 28 Raymund Road,
OXFORD, OX3 0SW.
E-mail: AbAstro@ATRamsey.com
Phone: 01865 426269 / 07808 706144

STAR CHART



The Night Sky at 11.59pm (BST) next Saturday (19th May)

This is how late you will need to stay up to get a really dark sky. Saturn is just past the meridian in Virgo, Mars is further west just below Leo. Arcturus, the brightest star in the northern hemisphere is almost due south. Ursa Major dominates the northern view. The summer triangle of Vega, Altair and Deneb are in the east and will dominate the view overhead as the summer comes.