

The CHESTERFIELD ASTRONOMICAL SOCIETY

Newsletter July 2014

CAS website www.chesterfield-as.org.uk

Registered Charity No. 514048

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**Subscriptions - full membership £60
or £6 per month by Standing Order (10 months)**

**Senior citizens (60 yrs and over) and students (18 yrs and over) £40
or £4 per month by Standing Order (10 months)**

**Juniors members - (17 yrs and under) £0.
(All juniors must be accompanied by an adult who must be a fully paid up member).**

Welcome to the JULY issue of the CAS newsletter.

CAS News

Entry donation

At the last committee meeting it was agreed that all visitors, non-members or lapsed members will be asked for a £2 donation (per adult, children free) for entry to the Observatory. We are aware that most of you do make donations/contributions etc. and we are very grateful for this. Most of you will probably have had an e-mail from Graham Leaver about this.

If any new member or lapsed member re-joining wishesto use the big telescope then they must take a telescope test. This is a written procedure including the opening and closing sequence of the dome and lecture room as well as using the telescope. This is mainly for safety and protection of the premises, equipment and other members as well as yourself.

Saturday 12th July – The Avenue Washlands Nature Reserve Dusk to Dawn event

We don't have definite details on this yet. We may be attending in the afternoon but are waiting for further information, i.e. times etc. and what if wet? The event, as it says, is dusk to dawn. Mark E has offered to do a talk in the evening but this has not yet been confirmed.

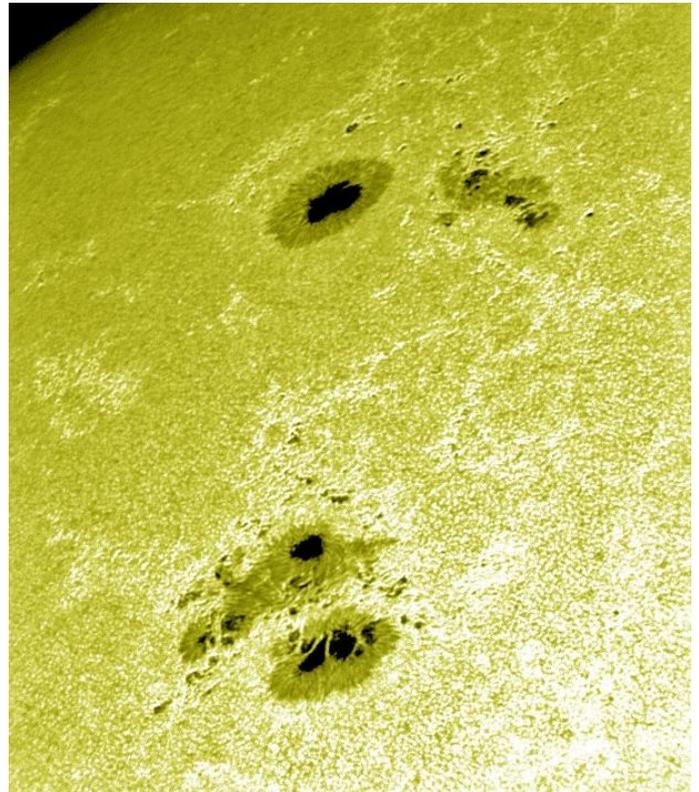
An e-mail will be sent to you all when the details have been confirmed one way or the other.

Restoration work to car park

We are still pursuing funding for this from Viridor. We have three quotes to submit to them after 'passing' the initial pre-application. These now have to be submitted with the formal application. Hopefully we will be successful which will allow us to make the car parking area aesthetically more pleasing and a lot more accessible in bad weather.
Mark McKeown

Photo Gallery.....

These are from Graham Leaver.....



Some good details of sun spots and plages.



This one
speaks for
itself!

Thanks
Graham.

Reminder.....

Please remember if you are ordering from Amazon do it through our website. Mark has kindly set up the link to follow – this earns us commission!!

<http://www.chesterfield-as.org.uk/>

(Just be aware of “phishing” e-mails. These are bogus e-mails which look like they have been sent from the company you are dealing with, i.e. Amazon, etc. These companies will NEVER ask you for your details or passwords so just be aware of this for security).

Things to look for in JULY.....

- Tuesday 1st Noctilucent cloud season is in full swing so remember to look low in the northwest one or two hours before sunrise. Noctilucent clouds have an eerie electric blue glow.
- Friday 4th At precisely 01:13 BST Earth will be at its greatest orbital distance from the Sun (aphelion), precisely 152,093,407 km. Our star’s diameter will be at an annual minimum.
- Saturday 5th Look out for a just past first quarter Moon low in the southwest as darkness falls. The bright dot to the left of the Moon is Mars. As the pair descent towards the horizon they appear to get closer, being 1.5° apart just before they set.
- Friday 11th Tonight and over the next few nights keep a look out for the low down fuller phases of the Moon. See if you experience the ‘Moon illusion’, an effect that makes you perceive the Moon to be larger than it actually is.
- Sunday 20th Brilliant Venus is just 1.5° to the south of the open cluster M35. With clear skies and a very flat northeast horizon you might just catch the pairing as Venus rises but it will be in the bright dawn sky.
- Thursday 24th The pre-sunrise sky shows mag. -0.8 Mercury close to the northeast horizon and brilliant mag. -3.8 Venus above and to the right of it. A delicate waning crescent Moon (7% lit) lies just to the right of Venus. Catch them from about 04:00 BST.
- Tuesday 29th Tonight sees the first peak of the Southern Delta Aquariid meteor shower which has a zenithal hourly rate of around 16 meteors. This year’s conditions are very favourable thanks to the absence of the Moon.

Although the nights are short there is an array of beautiful things to observe this month including the Northern Cross asterism, which sits virtually overhead most of the night. Through a telescope you will be able to split Albireo the showpiece yellow-blue double star at the base of the cross (or the head of the Swan in Cygnus).

As we reach the end of July the nights are getting longer and darker allowing you to spot the Milky Way under good dark skies. The Moon is out of the way at this time giving the level of darkness you will need.

Catch the Teapot asterism in Sagittarius low down in the south just after midnight BST. Some fabulous deep sky objects sit just above this asterism's spout, among them the Lagoon and Trifid Nebulae, M8 and M20.

ASTROSTUFF

Cracks in Pluto's moon could indicate it once had an underground ocean

If the icy surface of Pluto's giant moon Charon is cracked, analysis of the fractures could reveal if its interior was warm, perhaps warm enough to have maintained a subterranean ocean of liquid water, according to a new NASA-funded study.

Pluto is an extremely distant world, orbiting the sun more than 29 times farther than Earth. With a surface temperature estimated to be about minus 229 degrees Celsius, the environment at Pluto is far too cold to allow liquid water on its surface. Pluto's moons are in the same frigid environment.

Pluto's remoteness and small size make it difficult to observe, but in July of 2015, NASA's New Horizons spacecraft will be the first to visit Pluto and Charon, and will provide the most detailed observations to date. "Our model predicts different fracture patterns on the surface of Charon depending on the thickness of its surface ice, the structure of the moon's interior and how easily it deforms and how its orbit evolved," said Alyssa Rhoden of NASA's Goddard Space Flight Center in Greenbelt, Maryland. "By comparing the actual New Horizons observations of Charon to the various predictions, we can see what fits best and discover if Charon could have had a subsurface ocean in its past, driven by high eccentricity." Some moons around the gas giant planets in the outer solar system have cracked surfaces with evidence for ocean interiors -- Jupiter's moon Europa and Saturn's moon Enceladus are two examples.

As Europa and Enceladus move in their orbits, a gravitational tug-of-war between their respective parent planets and neighboring moons keeps their orbits from becoming circular. Instead, these moons have eccentric (slightly oval-shaped) orbits, which raise daily tides that flex the interior and stress the surface. It is thought that tidal heating has extended the lifetimes of subsurface oceans on Europa and Enceladus by keeping their interiors warm.

In Charon's case, this study finds that a past high eccentricity could have generated large tides, causing friction and surface fractures. The moon is unusually massive compared to its planet, about one-eighth of Pluto's mass, a solar system record. It is thought to have formed much closer to Pluto, after a giant impact ejected material off the planet's surface. The material went

into orbit around Pluto and coalesced under its own gravity to form Charon and several smaller moons.

Initially, there would have been strong tides on both worlds as gravity between Pluto and Charon caused their surfaces to bulge toward each other, generating friction in their interiors. This friction would have also caused the tides to slightly lag behind their orbital positions. The lag would act like a brake on Pluto, causing its rotation to slow while transferring that rotational energy to Charon, making it speed up and move farther away from Pluto.

"Depending on exactly how Charon's orbit evolved, particularly if it went through a high-eccentricity phase, there may have been enough heat from tidal deformation to maintain liquid water beneath the surface of Charon for some time," said Rhoden. "Using plausible interior structure models that include an ocean, we found it wouldn't have taken much eccentricity (less than 0.01) to generate surface fractures like we are seeing on Europa." "Since it's so easy to get fractures, if we get to Charon and there are none, it puts a very strong constraint on how high the eccentricity could have been and how warm the interior ever could have been," adds Rhoden. "This research gives us a head start on the New Horizons arrival -- what should we look for and what can we learn from it. We're going to Pluto and Pluto is fascinating, but Charon is also going to be fascinating."

Based on observations from telescopes, Charon's orbit is now in a stable end state: a circular orbit with the rotation of both Pluto and Charon slowed to the point where they always show the same side to each other. Its current orbit is not expected to generate significant tides, so any ancient underground ocean may be frozen by now, according to Rhoden.

Since liquid water is a necessary ingredient for known forms of life, the oceans of Europa and Enceladus are considered to be places where extraterrestrial life might be found. However, life also requires a useable energy source and an ample supply of many key elements, such as carbon, nitrogen, and phosphorus. It is unknown if those oceans harbour these additional ingredients, or if they have existed long enough for life to form. The same questions would apply to any ancient ocean that may have existed beneath the icy crust of Charon.

This research was funded by the NASA Postdoctoral Program at the NASA Goddard Space Flight Center, administered by Oak Ridge Associated Universities, and NASA Headquarters through the Science Innovation Fund.

FUN STUFF

What They Say:

It is a difficult double star.

This is a test for a 4" telescope.

An experienced observer can detect a star's variability.

What They Really Mean:

If you see two stars, it is probably wishful thinking.

Use a 10" and maybe you'll see it.

If you haven't been observing for at least ten years, don't try it.

The colour contrast is striking.

The spectrum is unusual.

The ideal book for an amateur astronomer.

The cluster has over two hundred stars.

The slightest haze will obscure it.

The telescope's optics are superb.

The site offers clear skies all year round.

A person with average eyesight can split this pair.

If it is cloudy, other activities are planned.

Observations were terminated at 2 a.m. because of haze.

"Oh, that's neat." (Spoken by your non-astronomer neighbour after being shown M31).

After moonrise, members ceased deep-sky activities and enjoyed pleasant views of the moon.

Oh, so true !!

That's all folks.

Sue



This newsletter is sent out to all present members without whom the Society could not survive. Also to previous members and people with an interest in astronomy in the hope that they may wish to join/re-join the Society.

If you no longer wish to receive this newsletter by e-mail please let us know. Thank you.

One star is white, the other is white.

I can't understand it.

"Brush up on your maths".

I counted twenty-five with a 10" telescope.

You probably won't see it on the clearest night.

They magnify atmospheric disturbances perfectly.

It is two hundred miles from civilization.

Over half the world must be blind.

Who's fetching the pizza and beer?

I got cold and sleepy, and ran out of chocolate biscuits.

"How much did you say you paid for this thing?"

Everybody cursed, seared their retinas before packing up and going home.

