

# SPACEWATCH

the newsletter of the Abingdon Astronomical Society

**Next Talk**  
**9<sup>th</sup> March 2020**  
**Studies of Nearby Star Clusters using data**  
**from GAIA**  
**Dr Floor Van Leeuwen**  
**University of Cambridge**

## EDITORIAL

I apologise for the quality of the star map in this edition of SpaceWatch but unfortunately I was away from my usual computer and could not get the scaling right. Thanks go to all the volunteers at the Oxford University Stargazing event. Although the weather did not cooperate a lot of people came through and this was followed by a lot of new people coming to the following observing evening. I was lucky enough to get some clear nights down in Devon and did manage to pick up some more obscure planetary nebulae using the hosts 20". This was a break from the usual run down there when we get no clear nights at all. Unfortunately the poor run of weather has meant that we don't have any images to publish again this month.. I am looking to try and decide whether to get SpaceWatch out at the beginning of the month as most people now seem to take it electronically and would welcome peoples feelings on this.

## THE NIGHT SKY FOR FEBRUARY 2020

By Steve Creasey & Cristina Garcia Pozuelo Sanchez

January was a bit of a mixed bag, there were quite a few decent clear nights where I was able to get out and do a bit of imaging, using my William Optics GT71 f/5.9 triplet, as I had inadvertently allowed another spider to set up residence in my Altair Astro 8" RC, when removing my DSLR to take away and forgetting to plug the remaining hole left in the focuser.

The Stargazing live event in the Physics department of Oxford university, was a great success with a reported 1200 visitors throughout the day, despite the fact that no actual stargazing was done due to the usual blanket of cloud which seems to accompany this event. After an exhausting day, I think we all felt like we had talked to most of the 1200 visitors.

Also, for a nice change, we were able to hold an observation evening in January at our site in Tubney, being just a few days after the Stargazing Live event, it was always going to be a busy one. 15 – 20 people turned up, mainly people we had spoken too at SGL. It was great to see so many enthusiastic people and most seemed genuinely excited to look at another galaxy for the first time, among other things. It would have been nice to have been better represented by our members, with a few more scopes, as we only had two on the night, John Reader with his 80mm refractor and my 6" RC, hopefully see more of you at the next one.

### The Planets

**Mercury** – Mercury (in Aquarius) is an evening object which may be seen low in the fading twilight for the first three weeks of the month. Search for it with binoculars in the WSW sky, when the tiny elusive jewel of light may be seen in the twilight. The planet reaches its greatest elongation east of the Sun (18°) on the 10th; after which it moves in to inferior conjunction with the Sun on the 26th.

**Venus** – Venus is a resplendent evening object throughout the entire month, and may be seen in the west for four hours after the Sun sets. It is, as always, the third brightest celestial object as seen from Earth, after the Sun and the Moon. Venus is so bright that it can cast the shadow of your finger onto a white sheet of paper when it is held between Venus and the paper. You must of course have no interference from the Moon if it is in the sky, and any artificial light. The magnitude of Venus is (minus) -4.1. As twilight fades on the evening of the 27th, there is the beautiful spectacle of the waxing crescent Moon with earthshine on the Moon's night hemisphere in conjunction with Venus. The two are separated by 6° at 19h with the Moon to the lower left of the 'Evening Star'.

**Mars** – During February Mars rises a couple of hours before the Sun, and may be searched for as twilight begins low in the SE in the constellation of Sagittarius the Archer. The planet has the appearance of a reddish first magnitude star, slowly increasing in brightness as Earth moves towards it and its opposition, in October. On the morning of the 18th at 05h, the waning crescent Moon, with earthshine, can

be seen approaching Mars as the two are rising low in the SE. Seen close to the Moon, the reddish colour of Mars is clearly visible.

**Jupiter** – During February Jupiter emerges from the glare of the Sun, and by the end of the month, the planet rises almost two hours before the Sun. It lies in the constellation of Sagittarius, like Mars, and because of this, must be looked for low in the SE sky as it is rising at about 06h. At 06h on the 19th, the waning crescent Moon with earthshine lies 6° to the west (right) of Jupiter and 9° to the east (lower left) of Mars. The season for observing the planet with its satellites is under way, so sharply focussed firmly fixed binoculars will reveal the disc of the planet and the ever-changing positions of the Galilean satellites.

**Saturn** – At the beginning of February, Saturn, also in Sagittarius, rises in the SE, just less than an hour before the Sun, and by the end of the month is rising just 80 minutes before the Sun; therefore throughout the month, Saturn and its rings are difficult to observe. The waning crescent Moon and Saturn may be seen rising in the SE at around 06h30 on the morning of the 20th; the use of binoculars in the bright twilight should help you locate them as they lie 4° apart.

**Uranus** – Uranus spends all of 2020 in the constellation of Aries the Ram. It can be spotted in the evening sky from Jan. 1 to April 8, then shift to the morning sky from May 12 to Oct. 30. Uranus returns to the evening sky from Oct. 31 to Dec. 31

**Neptune** – Neptune, is still in the constellation of Aquarius, but sets soon after the Sun during this month, and is therefore very difficult to observe.

### **Meteor showers**

There are no major meteor showers this month, however February is the start of the evening fireball season, when an abundance of fireballs seem to occur. This lasts well into April as seen from the northern hemisphere.

### **Comets**

C/2017 T2 (PanSTARRS) mag 9 and brightening, in the constellation of Perseus

Recently discovered comet C/2020 A2 (Iwamoto) is a morning object at about mag 11 moving from Lyra to Cepheus

C/2019 Y1 (ATLAS) mag 11.4 brightening to mag 10 in March. In the constellation of Pisces

### **Deep Sky Objects**

## **February deep sky targets**

A good mix of DSOs this month and all contained in a fairly small region of the sky.

M79, Globular cluster, 42,000 light years away, seen in the constellation of Lepus  
NGC 1909, the Witch Head nebula in the constellation of Orion  
NGC 2610, a Planetary nebula in the constellation of Hydra  
M41, an Open cluster in Canis Major  
NGC 2204, an Open Cluster in Canis Major  
NGC 2207 and IC 2163, a pair of colliding galaxies, 80 million light years away, seen in Canis Major  
NGC 2359, Thors Helmet nebula in Canis Major  
IC 418, the Spirograph nebula, a Planetary nebula in the constellation of Lepus  
M 50, The Heart shaped cluster, is an open cluster in the constellation Monoceros  
NGC 2903 is a field barred spiral galaxy about 30 million light-years away in the constellation Leo

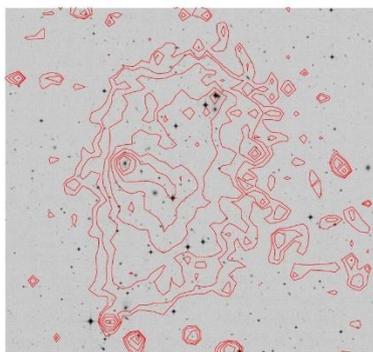
## **LAST MONTHS TALK**

### **2020 January's talk**

Professor Justin Reed of the University of Surrey gave an excellent talk: "How to heat up Dark Matter" Evidence for dark matter was already popping up with Vera Rubin who observed stars in their orbits in M31 and saw their velocity stayed high regardless of how far away they were from the galactic centre. Originally this was thought to be because of invisible molecular and ionized hydrogen but then when searches were made this was not detected. Fifty years later there are so many more galaxies that are detectable by us but we can only see a cross section of the universe. We just can't live long enough to see these galaxies evolving yet we seem to be looking at them all at a point which suggests they're spiralling or spinning out of control. Why? Are M31 and lots of other galaxies really spinning so fast that they're about to fall apart? What unseen mass do they have that holds them together? Newton and Einstein don't make sense.

Prof Reed looked at the effects of gravitational lensing, which extends the range of what we are able to detect, as well as letting us see much further back in time, so we could see if this was happening to galaxies as they were actually forming not long after the Big Bang. An unusual example is the Bullet cluster, two clusters of galaxies (The most famous example here is 1E0657-56, known as the bullet

cluster, in Carina but the speaker also worked on the pair of galaxy clusters known as Abell 4067 in Toucanae).



One cluster has drifted through the other and the gas has been stripped out of the clusters and remains in the centre and this is producing very hot (million degree) gas emitting in x-rays. There is intergalactic gas that being lensed. He gave us a rather lovely example of lensing if you happen to break the top off a wine glass and look up through the base. You get a full Einstein ring if you look directly up through the middle.

The theory is that the early universe was all dark matter than there appeared random concentrations, quantum fluctuations, which then coalesced into star forming clumps and then galaxies. Other bits of dark matter are still sitting out there, cold. Prof Reed's own researches on dark matter have concentrated on 20 dwarf galaxies because they are smaller, with settled star populations, and he has been able to age them from a few billion years to over 13 billion years. The dwarf galaxies are not normally actively forming stars and are more quiescent than normal galaxies (on the whole! See below for my notes on M82, which is small enough to be called a dwarf.)

Star analysis indicates the dwarf galaxy WLM (Wolf-Lundmark-Melotte) is over 13.8 billion years old. That and Fornax (12by) formed out of this drifting dark matter and they still appear to have a lot of dark matter but something has driven it out from the centre. His modelling predicts there should be more in the centre. (WLM has about 10 million stars and still has lots of molecular hydrogen.) Prof Reed calls this 'dark matter heating', although he is not sure what is happening. He does think there is evidence in M82, the starburst galaxy which has been undergoing some fluctuating gravitational forces which have caused waves of star formation which are dying off in waves of supernovae explosions. These waves are so seismic that huge clouds of matter are wafting out from the poles. Is this activity heating and pushing the dark matter out?

He also mentions the Draco dwarf is much younger and appears to have much more dark matter in the centre, but is has also fallen into the Milky Way and has only got about a million stars left. It doesn't appear to have

enough mass left to do much with its dark matter. Prof Reed finished off with some theories of what dark matter could be. He thinks it's some kind of particle which may suffer some kind of decay, like radioactivity. Apparently there are three types of neutrino flavours that behave like this already, but neutrinos are too weakly interacting and too active, so they can't be the missing dark matter. Attempts have been made to detect it, such as the LUX, a Liquid Underground Xenon tank, situated well underground in order to reduce the effects of cosmic rays. As dark matter particles would be very weakly interacting (like neutrinos), they would be able to travel up through the bulk of the Earth and be detectable. But they haven't been observed. There is the neutralino hypothesis, a neutrino with a stronger force, and a denser cold neutrino hypothesis. Work for the LHC and its proton smashing talents.

Please do comment if I've got this wrong. Prof Reed's research is ground-breaking and the talk was mind-blowing, so I've already asked him if he can please come back in a couple of years to give us an update.

#### **DATES FOR YOUR DIARY**

**Next Beginners meeting is Monday 17<sup>th</sup> February at the usual venue. Talks will include Evolution of the Universe, Filters for Planetary Observing and Doing a Messier Marathon seasons, although talks subject to change.**

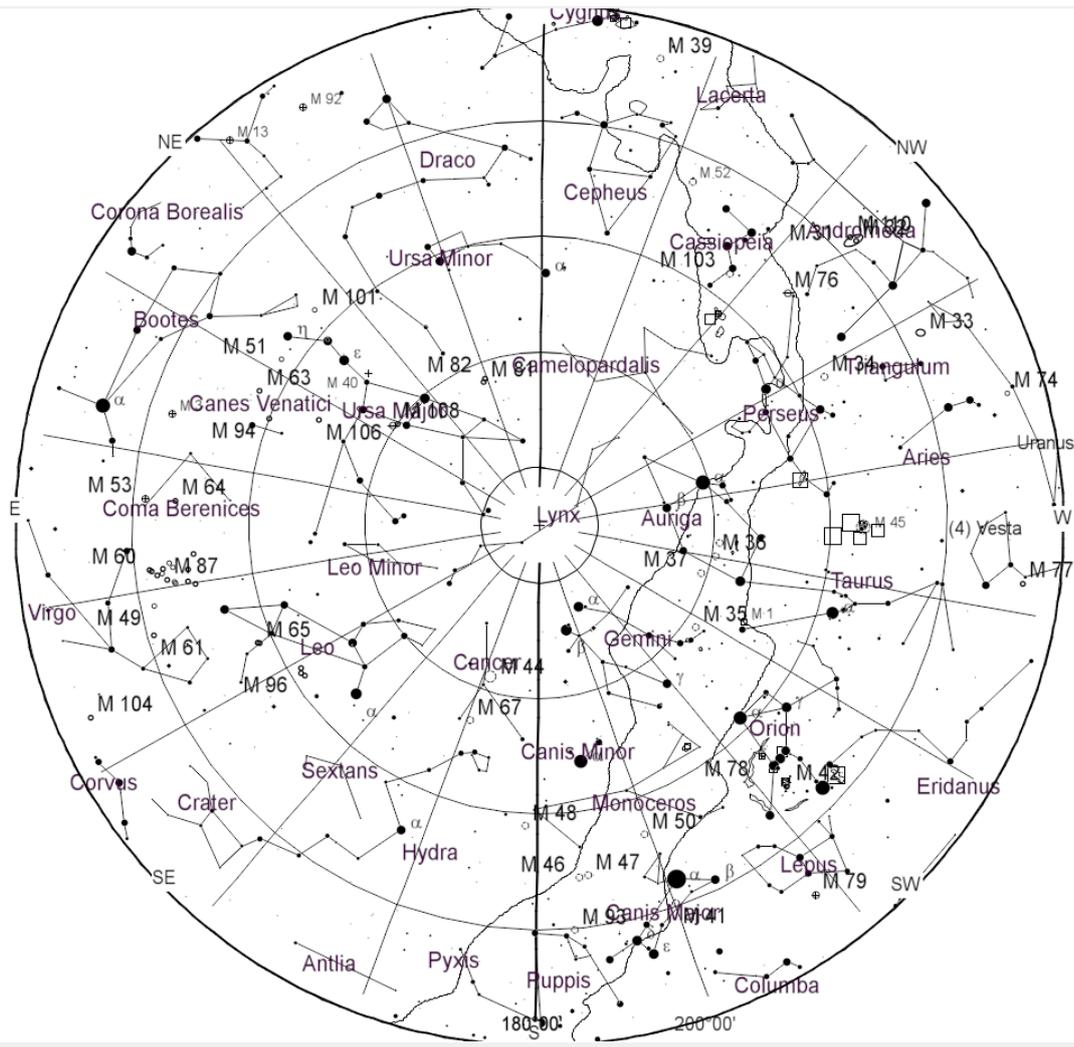
**Observing evening: Observing evening: Observing evening: The next observing session will be on the FCN 24<sup>th</sup> Feb - 26<sup>th</sup> Feb at Frilford Heath Tubney Golf driving range, note that this is a new location and maps will be on the website. As always go/no go notes will be posted on the newsgroup as well as the Facebook page so please look there for more info or contact Steve Creasey for details**

**Practical Astronomy Show Kettering 21<sup>st</sup> March details at <https://practicalastroshow.com/> note this is free entry and free talks.**

**ATOM Science festival. Abingdon Town Centre Saturday 14<sup>th</sup> March 2020. Volunteers wanted**

# STAR CHART

The night sky at 21:00 (GMT) Saturday 15<sup>th</sup> February 2020



## MOON PHASES: 2020

