

Hi there everybody,

just want to remind everyone of the June 16th club viewing night. It is going to be held, weather permitting, at Joe Hyam Park, North Nowra starting at dusk, which is around 5:30 to 6 PM. There is plenty of off-park parking outside the perimeter of the park on the grassy area which will hold perhaps 10 cars easily. The park and the grassy car park is easily accessed from the end of Booragal Place. The oval and entrance to the oval (on Booragal) is mostly flat. I would dress warmly and bring a portable light source. You will have about 50 to 75 metres of travel to get your telescope to the viewing area.

Here's how to get to the Joe Hyam Park parking area from the North Nowra Shops: From the turning circle by the shops turn west into McMahon's Road. Almost immediately turn left onto Hanson's Road. Take this road to the T intersection and turn right onto Gunyuma. Travel on Gunyuma until you hit the T intersection and turn left onto Yurunga. Travel on Yurunga about 300 metres and turn left onto Kareela Crescent. Go about 75 metres and turn left onto Booragal. Joe Hyam Park is at the end of Booragal. My home is located at 11 Booragal Place so it will be open for coffee, tea, and biscuits which I will have on hand. Toilets will be available also.

President Frank Gross

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New Moon First Quarter Full Moon Last Quarter 14 June 20 June 28 June 6 July

Viewing Nights

Club viewing nights are selected to provide viewers with the best possible conditions for good viewing. They are held on specific Saturdays at different locations around Nowra.

The next club viewing night will be on Saturday 16 June (back-up night Sun 17 June) at Joe Hyam Park, North Nowra (see directions above).

More viewing nights Page 12

OUT THERE Bob Turnbull OBSERVATION OFFICER

OUT THERE – JULY/AUGUST

MARS

Is the target for July and as I have been previously suggesting, Photography should be the way to go. Driven telescopes should be the best option and since there are a few of these in the club, we should match them up with suitable cameras.

I am one who has a driven scope but lack the camera or connecter for this purpose. The still or sequential multiple pictures for stacking and processing, and video images, which could be gathered at 30 minute intervals for 1 or two minutes then another video grab at 30 minutes etc.

Practice would be a smart way to train us so when the real time arrives we will know how to do it at our best.

WARNING There will be a full MOON when Mars reaches opposition Can you believe it !!? so masking the camera and scope may help with Moonlight which may degrade our images.

SATURN

Can be seen in mid August transiting in the rich stars of Sagittarius in retrograde and finishes in the Trifid and Lagoon nebulae

JUPITER

Is in Libra high in the NW and stays within 2 degrees of Alpha Librae, which is duller than the Beta star!

NEPTUNE

Is at opposition early next month (September) but in August it is rising just after astronomical twilight.

IMAGING The ISS

If you have the will to photograph this International Space Station read the excellent notes on p.52 of your Astronomy 2018. Low magnification should be tried initially as this should give a better chance with this close, and thus fast moving subject.

Clear viewing

Bob Turnbull

Sky Objects By Eugene O'Connor



A Search for Southern Doubles



Our journey in search of double stars often takes us through the less sequestered sections of the night sky and I must admit that like all stargazers I am attracted to the bright lights and often bypass some of the richness of the sky's forgotten constellations. Lupus the Wolf is one such forgotten area of sky, lying as it does between the Sting of Scorpio and The Pointers in Centaurus. This month I will try and rectify that and demonstrate that even this overlooked area of sky holds its own glimmering jewels. The map below will help you find this elusive constellation. You might also use Map 1 in the 2018 Astronomy Yearbook – but as is often the case – it needs to be turned upside down!

Finding this constellation is helped by studying the triangle that leads to the heart of the action. Beta and Alpha Centaurus form the base of a triangle of while Zeta Lup is the flattened apex some degrees to the NE. See Map. Other stars are found by identifying a mag 2 isosceles triangle formed by Kappa and Eta Centaurus and Beta Lupus(Triangles in Red on map below).

Five of the Best Double Stars in Lupus

1.Zeta Lup.∆176. RA 15hr.12m; Dec. -52° 06'; mag. 3.5/6.6; sep.71.8"

This is a wide double, easy to split with a nice contrasting pair of White primary and Light Blue secondary.

2.Epsilon Lup. RA 15hr.22.7m; Dec.-44° 41'; mag. 3.6/9.1; sep. 26.3"

Again, another wide pair with the companion a little

more difficult. The main star is yellowish white, and the faint companion is light blue.

3. Eta Lup. RA 16hr.00'; Dec. -38° 24'; mag.3.4/7.5; sep.14.8"

Eta is located in a rich field of stars at medium power. The dazzling white primary has a close light blue companion.



Sky Objects By Eugene O'Connor

Cont...2

- 4. Mu Lup. H4753, RA 15h.18.5'; Dec. -47° 53'; mag. 5/4.9/6.3. sep.1.0"/22" Stars abound in this field. The brighter stars in the field are V1 and V 2(Nu1, Nu 2).Colours are superb! Yellow, Blue and Rose.
 5.Kappa Lup. Δ 177 RA 15hr.11'; Dec. -48°44'; mag. 3.8/5.5 sep.27"
- This a showcase pair of Yellowish White and Light Blue gems. See if you notice a greenish tinge in the secondary star. Small telescope owners should easily spot this one. *Others worth seeking are Xi, a light yellow and rose pair and --a challenge to split, but I managed at X156 -- Pi Lupus.*



Lupus, the Wolf, in the SE sky after dark in June. Double stars numbered.

[At next month's meeting I will focus on easy binocular objects near Saturn in Sagittarius, and give details on tracking the Asteroid Vesta, approaching a very favourable opposition at mag. 5.3 in Mid- June). Take along your Year book and I attempt to make finding Vesta a bit easier.]



Below: map of Leo with all doubles listed. Good atlases show many more double stars.

The Astro Flyer

A monster black hole has been discovered, and it's growing very fast (but it's far, far away) AM By Lexi Metherell

Australian scientists have discovered the fastest growing black hole known in the universe.

It is growing at a rate of 1 per cent every 1 million years, and it is so big it is consuming a mass equivalent to our Sun every two days.



A long time ago, in a galaxy far, far away...

For those trying to unlock the secrets of the universe, the bigger a black hole is, the better.

And Dr Christian Wolf and his team at the ANU's Research School of Astronomy and Astrophysics have found a monster.

"What's really important in this business is now to actually find the most massive ones because they are the hardest ones to explain," he says.

Supermassive black holes — or quasars — are hard to find among the billions of stars in the universe.

The ultra-violet light emitted from the quasar was detected by the SkyMapper telescope at the ANU Siding Spring Observatory.

There is a supermassive black hole at the centre of our own galaxy, but compared to this one, it's a lightweight.

"That one has a mass of 5 million solar masses — that is 40,000 times less mass than the one that we have now found," Dr Wolf says.

"We estimate that this black hole has a mass of at least 20 billion times the mass of the Sun."

Cont...2



What a primordial quasar may have looked like - dark sky, bright sun in the centre, swirls of colour and light PHOTO: What did the first quasars look like? An artist's impression shows a primordial quasar as it might have been, surrounded by sheets of gas, dust, stars, and early star clusters. And it's a good thing this monster black hole isn't at the centre of our Milky Way.

As well as its ravenous appetite, it would likely emit so many X-rays, life probably couldn't exist.

But don't panic — Dr Wolf says we won't be sucked in.

"We don't have to be afraid of that. It is very far away," he says.

"The light has travelled for 12 billion years until it reached us and we were now able to see this.

"So this means it's far, far away in another galaxy and it will never drift and come over here."

Could this have triggered the big bang?

This supermassive quasar was around when the 13.8-billion-year-old universe was only about 1.2 billion years old.

That's a puzzle for scientists, who don't understand how quasars grew so big, so early in the history of the universe. Professor Tamara Davis, an astrophysicist at the University of Queensland, says it has implications for our understanding of how it all began.

"There's a big mystery about how these supermassive black holes form, because we don't understand how something could get that big that quickly; our normal theories don't work," she says.

"And it might mean that there were seeds to these black holes in the very early universe.

"During the birth of the universe, some really massive seeds were created that these black holes then formed around. "So, it actually has implications for how the universe began and what mechanism triggered the big bang."

The findings have been accepted for publication in the Publications of the Astronomical Society of Australia.

Cont...3

EM drive: New twist in 'impossible engine' experiments

IT'S impossible. But that hasn't stopped engineers from tackling the EM drive — a space engine that runs on zero fuel. By Jamie Seidel



Spacecraft Power

THE idea just won't go away. A space thruster that ... simply thrusts. There's no fuel. It's just a microwave reaction chamber. It's against the laws of physics. But does it work?

It's an experiment that has been bouncing around over the past two decades.

Take one copper cone. Put it in a vacuum. Apply microwaves. Measure the thrust.

China has built one. Even NASA has given it a go. They admit they measured ... something. But they're not sure if it's a glitch in their methodology — or real thrust.

Now a group of German physicists are giving it a go.

They told a meeting of the Aeronautics and Astronautics Association in France earlier this month that they're examining new technologies that will — hopefully — make interstellar travel possible. That's a big goal.

The ships in Star Wars never seem to need to pull in for a pit-stop

Cont...4

Electromagnetic Drive

Inertia of microwaves inside the cavity change as they bounce back and forth. To conserve momentum, they are forced to generate thrust.



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The ships in Star Wars never seem to need to pull in for a pit-stop. Picture: Star WarsSource:Supplied

PROPELLANT CHALLENGE

Only one of our spacecraft has crossed into interstellar space: Voyager 1. Coasting at 65,000km/h, it will take 80,000 years to reach our nearest neighbour, Alpha Centauri — if it was headed in that direction.

But what if it was still capable of producing thrust? It would still be accelerating. Getting faster. And faster. Doing that, however, would require an enormous source of propellant. Once in a reaction chamber, this 'explodes' to create the force which — when ejected from an exhaust port — provides thrust. Once it's used up — no more acceleration. Speed stays the same, except for the odd slingshot effect from the gravity wells of nearby worlds.

But what if your spacecraft didn't need to carry fuel?

If the 'impossible' engine really did work, it would revolutionise space travel.

But ... it's impossible.

It appears to violate the law of conservation of momentum: for every action, there must be an equal and opposite reaction. This experiment says you can move your car ... by sitting in the driver's seat and pushing at the window. Try it. It won't work.

So is there some as-yet undiscovered interaction within this seemingly simple device that somehow pulls propellant out of the fabric of space-time itself?

Or did someone simply make a mistake, somewhere?

Cont...5



The German EM drive in its lab.

IMPOSSIBLE AFTER ALL?

The German researchers want to rule it in — or out — once and for all.

They developed a new measuring system to determine if there really is thrust coming out of an EM drive, or it's the result of some as-yet undiscovered anomaly distorting their readings.

The Germans report they set up their sensors, and applied power to their EM drive.

The pumped in about 2 watts. The EmDrive registered about 4 micro-Newtons of thrust.

Then the Germans changed the direction the drive was facing.

They pumped in 2 watts. The EmDrive registered 4 micro-Newtons.

But the direction of the thrust **did not** change.

"This clearly indicates that the 'thrust' is not coming from the EmDrive, but some electromagnetic interaction," the researchers wrote. "Although we used twisted or coaxial cables as much as possible, some magnetic fields will eventually leak through our cables and connectors."

They've not given up entirely yet. They plan to further mask the device from any unwanted external magnetic fields. Once switched on again, hopefully we'll know: Does the EmDrive really produce something from nothing?

Planetary NGC 3242. Hya. By Harry Roberts

Planetary NGC 3242. Hya. "Wrangling a Ghost"!

Hartung describes N3242 thus: "This PN is so bright that both it and the single prism image are clearly shown by only 5cm aperture. Photographs indicate a central star m. 11.3 in a broad spindle 26"x16" in PA 145 deg which lies in a fainter ellipse 40" x 35". I have made out these features with 30cm, the spindle being brightest at the ends and the elliptical prism image shows a long narrow central streak from the star. R is estimated at 600 pc." (*"Astronomical Objects for Southern Telescopes"* Melb. Uni. 1984. P136.

Burnham writes "This is a fine PN, easily located 1.8" deg south of star Mu Hydrae. In the small telescope it shows as a pale bluish softly glowing disc about 40" x 35", appearing like a "Ghost of Jupiter". The total magnitude is about 9; the central star is 11.4 visually. A peculiar and interesting structure is shown in larger instruments".

Night 1.The writer had viewed N3242 before - but had no record of it until recently, when urged on (thanks EOC) and better Autumn nights offered. In the 10inch Dob with a wide-angle ep (32mm, 40X) a bright green 'bean' or ellipse was seen at the site: very obviously not stellar in a starry field. With higher power (160 - 260x) a soft-edged almost circular faint halo ~ 30 " arc diameter was seen; the ellipse lay inside the halo. The first impression had been of a small PN, but it is bigger, about the same size as Jupiter. There was then no sign of a central star or any other detail. The field was sketched with some effort to orient the PN correctly, using an occulting bar. Six rather bright stars in wide pairs ornamented the fov (Fig). Here the sketch was ended. A dark sky and cool W breeze gave good 'clarity' and 'seeing'. Yet the details needed more work and the next night seemed even better.

Night 2. Like many PNe, N3242 is a paradoxical creature: Hartung has it "clearly shown" in a 2inch scope, and Burnham sees the "softly glowing disc in a small scope". What is "small"? At 40X only the bright ellipse was seen – while at 160X much of the outer halo was also seen: the ellipse no longer so prominent. It was soon clear that the first sketch misaligned the nebula – it seemed now to lie NW to SE. At high power (260X), during good seeing, a darker centre region with a bright rim appeared with, it seemed, a faint central star! These are shown in the INSET of the Figure. The "Ghost" was proving to be a tricky target!

Nights 3 to 5. These helped in resolving "Ghost's" complex details. Soon a central ring, narrow and bright, dominated the view; not quite round, an 'iris', it came and went during variable seeing. Soon a bright 'star' was noted 'following' the iris as it passed across the FOV: a bright star lay not in the centre of the PN but on the E side!

Technique. S. J. O'Meara urges magnification of 75 per inch of aperture, or 750x in the Dob! I used only 260x and avoided any extra optics, but did test OIII and Hb filters on the nebula. The first did not improve the view, while Hb all but turned the PN 'off'! While revealing, apparently, a single star at the site? A diffraction grating showed a single spectrum, so it seems that "Ghost" shines mainly in OIII; it's a blue-green PN. What was the star?



The Astro Flyer

Planetary NGC 3242. Hya. "Wrangling a Ghost"! By Harry Roberts

Sketch. Fig & (Inset). Earlier records were scrapped as these complex 'bits' were merged in a coloured sketch on black paper. "Ghost" is one of the most complex PNe the artist has attempted. It has at least four distinct parts we will now review.



- 1. Outer Halo. Almost circular but patchy, this is faint, maybe only 20% the brightness of the central Ellipse.
- **2. Ellipse.** This is a bright shape three times longer than its width and fits neatly in the Halo. Inside this is the Iris.
- **3. Iris.** An almost circular ring, at least twice as bright as the Ellipse: this is the brightest part of the whole PN but is invisible during poor seeing. This is likely a sphere of excited gas blown in the halo by 'winds' and radiation from the unseen central progenitor star, the iris being the glowing rim of the sphere. The interior of the sphere is less bright than the surrounding ellipse or so it seemed.
- 4. Star'. First views had suggested a star at the centre of the PN but after five sessions it was clear no central star could be seen. However, a bright star-like object lay close 'following' the central Iris, i.e. on the east side. This, it seems, is a detached bright part of the Iris not a star at all! At times, a fainter 'companion' was suspected on the west 'preceding' side of the Iris too (but not confirmed). Viewing with a bigger 'scope might resolve some of these puzzles.
- To conclude, sorting out the 'features' of this small but complex planetary was a challenging task, with several 'first impressions' proved to be wrong. The proportions of each part are still uncertain.
- An HST image of only the central sphere (Iris) shows 'red' clumps of ejecta from the central star near the pointy ends of the ellipse; the whole thing must be a very dynamic object. Likely they are H-alpha ejecta moving at thousands of km/sec. and not visible in the optical band and an enhanced patch shown in the ionising sphere is perhaps the 'star' in the sketch.
- "Ghost's" many parts are borderline invisible and depend on rare moments of good seeing, so this wonderful object must remain subject to review when next autumn approaches. Clear skies!

More Club News continued from page 1

Club/Social Viewing Nights are on Saturday evenings "just" Before Sunset. Viewing nights are for members and invited guests. The contingency plan for poor weather on the proposed viewing night is to meet the next night (a Sunday night) but consult Jack first on Landline: 44232255, Mobile:0407 018 982

Woncur Road, South Nowra (Head South down The Princes Highway, turn right at BTU Road, Woncur Road is the street first on the left).

Dates for Club/Social Viewing Nights for 2018 On Saturday Nights As Follows:

Jun-16, Jul-14, Aug-11, Sep-8, Oct-6, Nov-10, Dec-8

More Monthly Meeting Information

The AGM was held at the July 2017 monthly meeting. Elected officials for 2017 - 2018

President: Frank Gross Vice President: John Gould Secretary/Treasurer: Tracey Newcombe Public Officer; Frank Gross Observation Officer: Robert Turnbull Editor: Kaye Johnston Librarian: Chris O'Hanlon

The Committee: Robert Turnbull, Rudolf Henssen, Robert Spruyt, Jack Apfelbaum, Chris O'Hanlon, John Gould

Check out the Astro Flyer on the web site: www.shoalhavenastronomers.asn.au

Shoalhaven Astronomers	The deadline for Articles for the Astro Flyer is The First Friday of the Month.
PO BOX 1053 Nowra NSW 2541	Editor Kaye Johnston

Club Video Projector Rental

The Video Projector is available for club members for a small rental fee. If a club member would like to project a football game, cricket game onto a wall for a party this is the way to go. You will get up to a 100 inch diagonal picture on a light coloured wall with the Epson video projector. The projector has an inbuilt speaker but you can add your own speaker units if necessary. The unit s very easy to use and instruction would be given before the borrowing (2 days) occurs. The rental price is set at present at \$15 for two days.