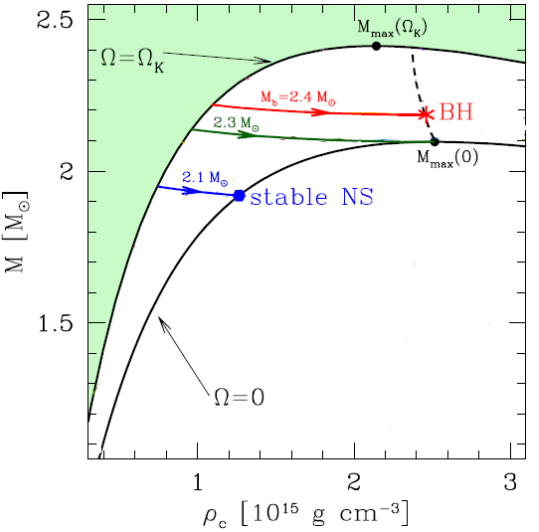
The Messenger
Mexborough & Swinton Astronomical Society
April 2017

A Blitzar and what might it be?

A neutron Star is usually thought to have occurred from the collapsed core of a high mass star. It is notable that these objects are very small – of the order of a few kilometres, and many rotate extremely fast. The fastest-spinning neutron star known is PSR J1748-2446ad, rotating at a rate of 716 times a second or 43,000 revolutions per minute, giving a linear speed at the surface on the order of a quarter of the speed of light!

It is known that the rotation of many of these neutron stars is decreasing as a rotating neutron star is also known as a pulsar – giving out a regular pulse of electromagnetic radiation as the emission sweeps across the earth which is highly regular and measurable. The neutron star spins slows due to the objects spinning magnetic field interacting with the galactic magnetic field and radiating energy in its own right.

If the object has too great a mass, something which occurs in excess of an upper limit of the size of neutron stars at 2–3 solar masses, it will continue collapsing to form a black hole. However a blitzar is thought to start from a neutron star with a mass that would cause it to collapse into a black hole but it spins fast enough so that its centrifugal force keeps the collapse from happening. After several million years of the pulsar's strong magnetic field radiating energy away and slowing its spin the weakening centrifugal force is no longer able to stop the pulsar from its transformation into a black hole.



The vertical axis of the graph is the Neutron Stars Mass in terms of Solar Mass, the horizontal axis the theoretical density – which increases as spin rate decreases. The blue and green paths show the movement of neutron stars which become stable, whilst a mass 2.4 star ends up as a black hole Basically high spin "stretches" the material and hence decreases the density – as the star spins down it becomes less dense.

At that instant the pulsar's magnetic field outside the black hole is suddenly cut off from its vanished source. This magnetic energy is instantly transformed into a very strong radio signal.

By January 20, 2015, seven radio events detected so far might represent such possible collapses. As the rotating magnetic field had previously cleared the surrounding space of gas and dust, there is no nearby material that will fall into the new black hole. Thus there is no burst of X-rays or gamma rays that usually happens when other black holes form. These radio events of called FRB's - fast radio burst a high-energy astrophysical phenomenon of unknown origin manifested as a transient radio pulse lasting only a few milliseconds. Blitzars were proposed in 2013 as the explanation for these events.

KEEP YOUR EYES OPEN

Thursday, 13th April: A Big Detector for Big Questions: (Astro) particle Physics With Hyper-Kamiokande



Jost Migenda

Why is there something (and not nothing)? How do giant stars explode? What is Dark Matter?

Physicists at the University of Sheffield are part of a worldwide effort to answer these questions with the help of Hyper-Kamiokande -- a giant detector buried deep underground. In this talk, Jost will describe how to build such a detector and what to do with it: look for the origins of our universe, watch stars explode and much, much more …

Thursday 4th May : Supernovae: exploding stars that have revolutionised astronomy



Justyn Maund

Justyn Maund is a University Research Fellow based at the University of Sheffield. Justyn graduated from Trinity College Cambridge with a PhD in astrophysics, before going on to hold the Supernova postdoctoral fellowship at the University of Texas at Austin and the Sophie & Tycho Brahe Fellowship, jointly held at the Dark Cosmology Centre Copenhagen and the University of California Santa Cruz. Justyn's research focuses on observationally constraining the nature of the explosion mechanism that destroys massive stars as supernovae.

Thursday, 18th May : Triumphs of Voyager pt1: Journey to Jupiter/Splendours of Saturn



Paul L Money

2017 is the 40th anniversary of the launch of the Voyager space probes to the outer solar system. This first of two talks takes a look at the remarkable mission and the many discoveries the Voyagers made before continuing on to the "Ice Giants".

Thursday, 25th May 2017 : The Life Cycle of a Massive Star



Katie Tehrani

Kate will speak about the life cycle of a massive star, explaining the key evolutionary stages from birth to supernovae, and how this journey differs from low mass stars.
Katie began studying astronomy in 2011 when she started her undergraduate degree at the University of Sheffield - She was lucky enough to be able to continue studying here as a postgraduate PhD student! Katie is a keen traveler, and through her studies recently had the opportunity to visit New Zealand to attend a massive stars conference. Other hobbies include baking and long walks trying (fruitlessly) to tire out her puppy - Bella!

SOLSTICE DINNER - FRIDAY JUNE 23rd 2017

This will be held next year at Rotherham Golf Club, Thryberg. 7.00pm for 7:45pm meal: Bar available to midnight.
We hope to have our Honorary President, Alan Chapman FRAS as our after dinner speaker

Menu choice forms are available from Roy – please return with £5 deposit – the remainder payable by the end of May. The total cost including deposit will be £25.

Mike Hall's April 2017 Skynopsis



Diary (all times BST Greenwich except Sunrise/Sunset, local (Sheffield) time).

1st	Twilight 06.04, Sunrise 06.40, Sunset 19.40; Twilight 20.15; Aldebaran 0.30 S of Moon
3rd	Moon at First Quarter
5th	Beehive Cluster3.80N of Moon
7th	04.30 Regulus is 0.70N of Moon; Jupiter at opposition
8thth	Twilight 05.47, Sunrise 06.23, Sunset 19.53, Twilight 20.29
9th	Beehive Cluster 3.90 North of Moon
10th	21.20 Jupiter 2.20 S of Moon
11th	Full Moon, Twilight 05.29, Sunrise 06.07, Sunset 20.05, Twilight 20.43
14th	06.00 Uranus in conjunction with Sun
15th	Twilight 05.29, Sunrise 06.07, Sunset 20.05, Twilight 20.43
16th	18.39 Jupiter 2.50S of Moon
18th	17.25 Saturn 3.20S of Moon
19th	Moon at last Quarter
21st	08.16 Mars 3.40S of Pleiades
22nd	Twilight 05.12, Sunrise 05.51, Sunset 20.18, Twilight 20.57: Lyrid meteor shower
23rd	Venus 5.20N of Moon
26th	New Moon
28th	Aldebaran 0.50S of Moon
29th	Twilight 04.56, Sunrise 05.36, Sunset 20.3121, Twilight at 21.11

The Solar System

Mercury	Good evening view but fading quickly after first week
Venus	Morning object in Pisces but very low in the East before sunrise
Mars	Visible as an evening object 3° south of the Pleiades (M45) 21 April, fading to mag. +1.6
Jupiter	Good visibility all month in
Saturn	Morning object in western Sagittarius but very poor visibility
Uranus	Not visible this month due to solar conjunction 14th April
Neptune	Not visible this month, obscured by morning twilight
Dwarf planets	Haumea at opposition in Bootes (CCD object); Ceres an early-evening object

Galactic Goodies.

Lyrid Meteor Shower; active from the 16th to 25th April peaking around 12h UT (01.00) on the 22nd.

Comet 41P/Tuttle-Giacobini-Kresak ,fading from magnitude +6.7 to +7.6; passing 0.6 deg. North of Thuba (alpha Draconis) 02.00 3rd April passing through to eta and eta Draconis to mag. +2.8 star beta Draconis (Rastaban) crossing into Hercules on the 20th. Next opportunity in 5.4 years.

Comet C/2015 V2 (Johnson) lies between tau and upsilon Herculis 22 April and between upslion and phi Herculis 25th April; predicted to brighten to +7.4 by the end of the month.

THE THOUGHTS OF CHAIRMAN LES



It's been a busy month once again. The BAA 'Back to Basics' Workshop Saturday 11th was a great success and everyone commented on how well we did in hosting the day. It took a lot of work by our members but I'm sure every one of you enjoyed the effort it took for the day to be such a success.
We had a very good turnout of members to hear Tony Morris give a memorial lecture entitled 'Jeff Williams memorial Science Lecture'. Jeff joined us in 1993 and died 2016 and through all that time he never stopped helping us along in his own inimitable way, he is sorely missed. Tony did a fantastic lecture with introducing Jeff's time with us and many of the things he did for us and his accomplishments and qualifications. Thanks Tony for a first class job well done.
I would like to mention here that our public outreach programme isn't getting the support that is needed. The Public Viewing Evenings (PVE's) in particular are suffering in this way. We provide 12 of these throughout a six week period in the dark months of winter and we find that there only seems to be about five members who are willing to help to staff these nights, a few more would make the work a lot easier. If we can't interest anyone to help we will have to reduce the number of evenings that we provide.
As you will know we need an extension to the north of the existing observatory but this is taking a long time to reconcile as the funding we need is proving to be extremely difficult. We know exactly what we want and how it would operate but cash to continue is not forthcoming. We continue to work on this but it's proving difficult.
We continue with our efforts to keep our society on its forward path to keep us on moving onward 'n upward.
I wish you clear skies

Les Marsden FRAS

Chairman



With permissions from https://xkcd.com/1758/

BRAHMAGUPTA



Indian mathematician and astronomer, born in 598AD and died 670AD in the city of Bhinmal, in the north-west of what is currently India. An orthodox Hindu, he was among the few thinkers of his era who had realized that the earth was not flat as many believed, but a sphere.

He is famous for the writing of two books on mathematics and astronomy. The first called Brahmasphutasiddhanta, meaning the 'Corrected Treatise of Brahma', dealt with the motion of the planets, lunar and solar eclipses, how the moons crescent was formed.
One of his most important "discoveries" was that he is believed to be the first mathematician to deal with the concept of zero.

Brahmagupta's understanding of the number systems went far beyond that of others of the period. In the Brahmasphutasiddhanta he defined zero as the result of subtracting a number from itself. He gave some properties as follows:-

When zero is added to a number or subtracted from a number, the number remains unchanged; and a number multiplied by zero becomes zero.
He also gives arithmetical rules in terms of fortunes (positive numbers) and debts (negative numbers):-

A debt minus zero is a debt.
A fortune minus zero is a fortune.
Zero minus zero is a zero.
A debt subtracted from zero is a fortune.
A fortune subtracted from zero is a debt.
The product of zero multiplied by a debt or fortune is zero.
The product of zero multiplied by zero is zero.
The product or quotient of two fortunes is one fortune.
The product or quotient of two debts is one fortune.
The product or quotient of a debt and a fortune is a debt.
The product or quotient of a fortune and a debt is a debt.

Brahmagupta then tried to extend arithmetic to include division by zero:-

Positive or negative numbers when divided by zero is a fraction with the zero as denominator.
Zero divided by negative or positive numbers is either zero or is expressed as a fraction with zero as numerator and the finite quantity as denominator.
Zero divided by zero is zero.

He also talked about 'gravity' in one of his statements saying: 'Bodies fall towards the earth as it is in the nature of the earth to attract bodies, just as it is in the nature of water to flow'.

Brahmagupta's first manuscript also calculated the length of the solar year at 365 days, 6 hours, 5 minutes, and 19 seconds, among the most accurate of early reckonings and remarkably close to the actual value of 365 days, 5 hours, 48 minutes, and about 45 seconds

BAA Back to Basics

On Saturday 11th March 2017 Mexborough & Swinton Astronomical Society had the pleasure in hosting a British Astronomical Association Back 2 Basics Workshop at Swinton Masonic Hall, Swinton, South Yorkshire.
Booking had been slow and our members appeared a little reticent to get started putting displays together but finally, we had confirmation of 71 delegates, speakers and hangers on. Everything was prepared. All the speakers had confirmed their attendance and the programme looked great.
A group of members got cracking and set up our displays, stage and projector on Friday afternoon which was a great help.
We arrived at 8.00am on the Saturday to find the boiler bubbling away a good sign for us tea bellies. Hazel Collet from the BAA was not far behind and we soon had the registration sorted. Just waiting for our delegates.

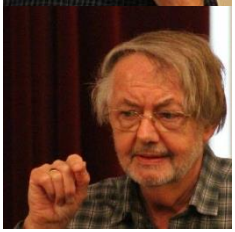


The crowds flooded in, well crept. More than enough if we had had many more we may have struggled for space.
The day began with Dr Jeremy Shears the BAA President welcoming the delegates and speakers .



The programme consisted of,





What astronomy can I do?	Hazel Collett
What equipment and books do I need?	Jeremy Shears
Lunar observing.	Bill Leatherbarrow

Lunch. An excellent spread, more than enough. We then resumed with:-

A History of MSAS.	Paul D'Silva (MSAS)
Planet Observing.	Mike Foulkes
Radio Astronomy.	Paul Hyde
Imaging for beginners.	Tony Morris (MSAS)

A very good day was had by all who attended but unfortunately, we did not attract the interest of any younger astronomers which is a shame. We were congratulated several times upon the friendly and helpful manner of our society members. It shows we are not a bad lot in Swinton. We may even volunteer again in the future, perhaps, maybe, we will think about it and I must not forget the excellent catering by Sarah Woodhouse who kept everyone well fed and watered all day long.
17 of our society members attended the event.
I would like to thank everyone who stayed behind to pack up. It made all the difference to have plenty of hands.
Thanks everybody.

Steve Taylor



Date	Time	Location	Subject / Event	
Thu Apr 6th	**19:45**	**Club Room**	**TBA**	*Jez Robinson*
Sat Apr 8th	**14:00**	**Club Room**	**Processing Jupiter Images**	*Paul D'Silva* *Roy Gunson*
Wed Apr 12th	**19:45**	**Club Room**	**Executive Committee Meeting**	
Thu Apr 13th	**19:45**	**Club Room**	**A Big Detector for Big Questions**	*Jost Migenda*
Thu Apr 20th	**19:45**	**Club Room**	**The Moons of Barsoom**	*Roy Gunson*
Thu Apr 27th	**19:45**	**Club Room**	**Daytime Astronomy**	*Mick Nicholls*
Thu May 4th	**19:45**	**Club Room**	**Supernovae**	*Dr. Justyn Maund*
Wed May 10th	**19:45**	**Club Room**	**Executive Committee Meeting**	
Thu May 11th	**19:45**	**Club Room**	**The Summer Sky**	*A Kirton-Vaughan*
Thu May 18th	**19:45**	**Club Room**	**The Triumphs of Voyager Pt 1**	*Paul Money*
Thu May 25th	**19:45**	**Club Room**	**The Life Cycle of a Massive Star**	*Katie Tehrani*

Old Moor RSPB – Manvers Way, Barnsley, S73 0YF
PVE – Public Viewing Event – Bookable Only
CAE – Community Access Event
PO – Public Outreach
TBA – To be announced – (otherwise – We don't know!)

Web site: http://msas.org.uk
Meeting room is at Swinton Working Men's Club, Station Street, Swinton, South Yorkshire, S64 8AU.
Observatory is at Lee Brook Lane, Hoober, S62 7SH
Mexborough & Swinton Astronomical Society is Registered Charity N° 1064103 in England & Wales

For submissions to The Messenger - Editor: Roy Gunson: royg@gmx.co.uk



Alexander Fleming, the discoverer of penicillin, grew "germ paintings" of living bacteria on blotting paper. He made this 4-inch portrait, titled "Guardsman," in 1933.

"If a paper disc is placed on the surface of an agar plate, the nutrient material diffuses through the paper sufficiently to maintain the growth of many microorganisms implanted on the surface of the paper," he wrote. "At any stage, growth can be stopped by the introduction of formalin. Finally the paper disc, with the culture on its surface, can be removed, dried, and suitably mounted."

Even in Fleming's time this technique failed to receive much attention or approval. Apparently he prepared a small exhibit of bacterial art for a royal visit to St Mary's by Queen Mary. The Queen was 'not amused and hurried past it' even though it included a patriotic rendition of the Union Jack in bacteria."