Ayrshire Astronomical Society Newsletter March 2015

Please send articles to newsletter@ayrastro.com

Apologies: Due to a mix up, the newsletter was not sent out before the club meeting which I wrongly assumed was the last Monday of the month.

Further apologies are due, for the late sending of the March newsletter as I've had a short stay in hospital and was just released today 31/03/15.

Name an exo-planet : The next stage of the name an exo-planet application is here for your perusal. More details on pages 4 to 7.

Star camp : The March Kilkerran star camp went well, apart from the dewing problems at around 01:30 hr during the first nights viewing. There are a few stories to come out of the adventure. I will leave the telling to next month (Hopefully articles from Allan, Paul, and Graham).

Loudoun Hall Feedback

Please continue to let us know your thoughts, both positive and negative, on the new venue. Any of the committee members can be approached at the meetings, or just e-mail. president@ayrastro.com.

Next Month meeting : 27th April. Speaker Alisdair Gow, Clyde space, Subject T.B.A.

If there are any newsletter articles please send them to the usual e-mail : newsletter@ayastro.com

Or by "snail mail" to George Corner,

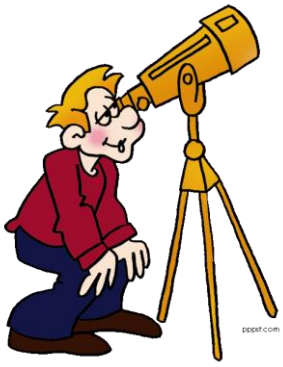
101 Lynn Drive,

Kilbirnie. KA25 7HL.

April Sky,

April 1st : Jupiter's moons line up, view in the early evening which weather depending should give approx. 5 hours observing window. Best viewing through binoculars or small telescope to see the Galilean moons

April 4th : Saturn starts rising before midnight, so now is the best time to start observing, despite its position in Scorpius, well south of the celestial equator. Saturn will reach its opposition in May.



April 10th to 12th : Photo opportunity of Venus as the dazzling planet passes South of the Pleiades star cluster in Taurus.

April 21st : Aldebaran is partially occulted by the moon, Orkney and Shetland will see a total occultation , but we in the mainland should see at least a grazing of the star.

April 22nd to 23rd : Meteor time. The Lyrid meteor shower should (Weather permitting) put on a decent show and the absence of a moon should make viewing even more attractive. Best times for viewing are between midnight and 05:00 hr. There is a possibility of around 10 shooting stars an hour as the radiant rises in the East.

April 30th : Mercury will put on a good evening show as it appears near the Pleiades shortly after sunset similar to Venus earlier in the month. Another photo opportunity perhaps?

Moon Phases :

April 4th	Full Moon	13:56 hr
April 12th	Last quarter	04:44 hr
April 18th	New moon	19:57 hr
April 26th	First quarter	00:55 hr

Alex's Space.

In the beginning- - - - - - - - - - - -

Experts cannot really explain the origin or the early development of our universe, but there is evidence which may give you real insight on this issue. This evidence comes from the four fundamental forces that are responsible for all changes affecting matter.

At the mere of "fundamental forces" you may hesitate, thinking, "that's solely for physicists"- - - - but not so, the basic facts are worth considering because they affect us- - - - and everything around us.

These forces come into play both in the vastness of the cosmos and in the infinite smallness of atomic structures- - - - yes they are very busy forces, so, let me quickly introduce them- - - -

On my right we have the Electromagnetic Force (EMF) and Gravity (G) and on my left the Strong Nuclear Force (SNF) and the Weak Nuclear Force (WNF)- - - - and their respective "jobs" are :

The Four Fundamental Physical Forces

EMF : The key attracting force between protons and electrons, allowing molecules to form.

G : A weak force on the level of atoms. It affects large objects- - - - Planets, Stars, Galaxies.

SNF : This force "Glues" protons and neutrons together in the nucleus of an atom.

WNF : This force governs the decay of radioactive elements and the efficient thermonuclear activity of the sun.

EMF is probably the most significant force as its "intensity" (strength) is finely "tuned" to the stability of the other three.

So, there we have it, providing EMF behaves itself and doesn't "upset" the other three everything in the universe will continue to operate in the same efficient way as it has done for millions of years, but let's suppose EMF has had a "bad hair day" and its intensity became erratic- - - would that be cause for concern ?- - - - most definitely yes, because in that scenario the following effects would manifest themselves :

If EMF was just fractionally weaker that would make G proportionally weaker and with lower gravity the stars would be smaller and the pressure of gravity in their cores would not drive the temperature high enough for nuclear fusion reactions to get underway- - - - the sun would be unable to shine- - - - yes it would be rather chilly- - - - and dark, but great observing conditions !! - - - - but what if EMF became stronger? would that be a problem? - - - - yes, I'm afraid so.

Gravity again would be proportionally affected. Stars like our own would find their life expectancy sharply reduced indeed, two remarkable qualities of our sun- - - - and other stars are long term efficiency and stability- - - - what do I mean by that? Let me try and explain.

We know that to run efficiently a car engine needs a critical ratio between fuel and air, engineers design complex mechanical and computer systems to optimize performance, if that is so with a mere engine, what of the efficiently “burning” stars such as our sun?

The structure of our universe involves much more than “fine tuning” just EMF and G - - - - SNF and WNF also play “star roles” in this universal opera.

I will tell you about their parts next month.

Alex Baillie

Name an Exoplanet Update

Naming of Exoplanets still Open for Business

A reminder that we are still in the process of collecting names to go into the draw for our submission to the IAU. Please give them to your illustrious President or better still email them to him on president@ayrastro.com as soon as possible.

Below is a copy of the letter received by Graham, regarding the name an exoplanet competition.

Dear all,

Thanks for your registration at the IAU Directory of World Astronomy website again. This is an update about the NameExoWorlds contest organized by the IAU and the Zooiverse.

In case you don't know what is the NameExoWorlds Contest, please refer to
http://www.iau.org/news/pressreleases/detail/iau1404/

Thanks for all of your votes, I'm happy to inform you that the most popular 20 ExoWorlds are listed below, and there will be 15 stars plus 32 planets - total 47 names - to be named.

Host Star (catalogue)	# Planet (designation)	Planet Mass (Jupiter mass)	Planet Mass (Earth mass)	Orbital Period (day)	Semi Major Axis (au)	Discovery (year)	Constellation (English)	Visibility	V magnitude
1 exoplanet (5 systems)									
Ain (epsilon Tauri)	epsilon Tauri b	7.6	2415.5	594.9	1.93	2007	the Bull	Visible to the naked eye	3.5

Edasich (iota Draconis)	iota Draconis b	8.82	2803.3	510.7	1.275	2002	the Dragon	Visible to the naked eye	3.3
Errai (gamma Cephei)	gamma Cephei b	1.85	588	903.3	2.05	2003	the King	Visible to the naked eye	3.2
Fomalhaut (alpha Piscis Austrini)	Fomalhaut b	3	953.5	320000	115	2008	the Southern Fish	Visible to the naked eye	1.2
Pollux (beta Geminorum)	beta Geminorum b	2.9	921.7	589.64	1.69	2006	the Twins	Visible to the naked eye	1.2
1 star + 1 exoplanet (10 systems)									
14 Andromedae	14 Andromedae b	5.33	1694	185.84	0.83	2008	the Chained Maiden	Visible to the naked eye	5.2
18 Delphinis	18 Delphinis b	10.3	3273.6	993.3	2.6	2008	the Dolphin	Faint to the naked eye	5.5
42 Draconis	42 Draconis b	3.88	1233.2	479.1	1.19	2008	the Dragon	Visible to the naked eye	4.8
51 Pegasi	51 Pegasi b	0.47	148.7	4.23	0.052	1995	the Winged Horse	Visible to the naked eye	5.5
epsilon Eridani	epsilon Eridani b	1.55	492.6	2502	3.39	2000	the River	Visible to the naked eye	3.7
HD 104985	HD 104985 b	6.3	2002.3	198.2	0.78	2003	the Giraffe	Faint to the naked eye	5.8
HD 149026	HD 149026 b	0.36	113.1	2.88	0.04288	2005	the Hercules	Visible through binocular	8.2
HD 81688	HD 81688 b	2.7	858.1	184.02	0.81	2008	the Great Bear	Visible to the naked eye	5.4
ksi Aquilae	ksi Aquilae b	2.8	889.9	136.75	0.68	2008	the Eagle	Visible to the naked eye	4.7
tau Bootis	tau Bootis b	5.9	1875.2	3.31	0.046	1996	the	Visible to the naked	4.5

							Herdsman	eye	
1 star + 2 exoplanets (1 system)									
47 Ursae Majoris	47 Ursae Majoris b	2.53	804.1	1078	2.1	1996	the Great Bear	Visible to the naked eye	5.1
	47 Ursae Majoris c	0.54	171.6	2391	3.6	2001	the Great Bear	Visible to the naked eye	5.1
1 star + 3 exoplanets (2 systems)									
PSR 1257 12	PSR 1257 12 b	7.00E-05	0.022	25.26	0.19	1992	the Maiden		
	PSR 1257 12 c	0.01	4.1	66.54	0.36	1992	the Maiden		
	PSR 1257 12 d	0.01	3.8	98.21	0.46	1992	the Maiden		
upsilon Andromedae	upsilon Andromedae b	0.62	197.1	4.62	0.059	1996	the Chained Maiden	Visible to the naked eye	4.1
	upsilon Andromedae c	1.8	572.1	237.7	0.861	1999	the Chained Maiden	Visible to the naked eye	4.1
	upsilon Andromedae d	10.19	3238.7	1302.61	2.55	1999	the Chained Maiden	Visible to the naked eye	4.1
1 star + 4 exoplanets (1 system)									
mu Arae	mu Arae b	1.68	532.7	643.25	1.5	2000	the Altar	Visible to the naked eye	5.2
	mu Arae c	0.03	10.6	9.64	0.09094	2004	the Altar	Visible to the naked eye	5.2
	mu Arae d	0.52	165.9	310.55	0.921	2004	the Altar	Visible to the naked eye	5.2
	mu Arae e	1.81	576.5	4205.8	5.235	2006	the Altar	Visible to the naked eye	5.2
1 star + 5 exoplanets (1 system)									

	55 Cancri b	0.8	254.3	14.65	0.1134	1996	the Crab	Faint to the naked eye	6
	55 Cancri c	0.17	53.7	44.34	0.2403	2002	the Crab	Faint to the naked eye	6
	55 Cancri d	3.84	1218.9	5218	5.76	2002	the Crab	Faint to the naked eye	6
	55 Cancri e	0.03	8.3	0.74	0.0156	2004	the Crab	Faint to the naked eye	6
55 Cancri	55 Cancri f	0.14	45.8	260.7	0.781	2007	the Crab	Faint to the naked eye	6

Please be reminded that you can select one and only one system for the naming proposal, no matter it is single or multiple planetary system.

Example: If you want to name 55 Cancri system, you will be able to sumbit the names for the host star (55 Cancri) plus its planets (55 Cancri b, 55 Cancri c, 55 Cancri d, 55 Cancri e, 55 Cancri f), a total of 6 names. If you want to name 51 Pegasi system, then you can only submit 2 names - the host star and the exoplanet.

The NameExoWorlds website is yet staging for this round of naming proposal submission. We will inform you once again it is opened. The deadline of submission is May 31, 2015.

Thank you very much of your interest in the contest.

Best wishes,
Sze-leung Cheung
International Outreach Coordinator
International Astronomical Union

Willow Bank School Space Day

The Society recently took part in a space day organised at Willow Bank Special School in Kilmarnock.

It was a great success enjoyed by pupils and teachers. Photos are on the website on the Events page and a PDF of the article (same photos) from the Kilmarnock standard is with this newsletter.

Picture from Kilmarnock standard (Below).

Kids with in their eyes

Clair Fullarton

The theme of the event was astronomy and the pupils enjoyed a portable planetarium provided by the Scottish Dark Skies Observatory in Dalmellington.

They were able to stargaze, watch constellations and see a short animated clip about a journey to the Moon.

Ayrshire Astronomical Society took along a variety of telescopes which allowed the students to look at different planets and

static electricity.

Rachel Gemmell, pr Willowbank, said: "We successful with a few s

Professor Danny Gorman and the Kilmarnock Engineering and Science Society (KESS) as their joint funding gave the students the opportunity to enjoy the

has shown what a great job all the staff and volunteers are doing at Willowbank and how important education is to all children."

"great day

Editors bit

In my recent four days of rest and recuperation I have had time to actually read a book!!

Frozen Star by George Greenstein, a Macdonald book @ 1983. I found some of his descriptions fired the imagination; I'd like to share one with you.

In my imagination I am floating weightlessly in space. Alongside me is an enormous orange wall stretching endlessly into the distance. It is part of a filament in the outskirts of the Crab Nebula. On all sides I am enveloped in a milky-white fog. It is emission from the electrons. Stars are visible in every direction, for the nebula is transparent, so diffuse it is very nearly a vacuum. Nevertheless it is filled with intense levels of radioactivity. Radiation consists in part of high-velocity particles, in this case the same that produced the nebular fog, and without massive shielding I would accumulate a lethal dose within seconds. It produces a noticeable heating effect.

Light years away, the pulsar at the nebula's core is a stroboscope. Its light comes in bursts, a brilliant flash and then a fainter one: Sixty pulses a second in a steady rhythm. From the outskirts of the nebula the object responsible for the bursts – the "lighthouse" emitting the flashes- is too small to be seen. The largest telescope we have would not be capable of spotting it from here.

I move in toward the heart of the Crab. The level of radioactivity rises. It is concentrated toward the pulsar- it comes from the pulsar. The radiation exerts a noticeable pressure, and it is this force that accelerates the nebula's expansion. As for the pulsar, a moving picture shot from here would reveal something of its nature to me. Played in slow motion the movie would show two beams of light, one brighter than the other, pointing in nearly opposite directions, spinning wildly at thirty rotations per second.

I move still closer. I move to within 93 million miles of the pulsar, the distance from the Earth to the Sun. The pulsations are overwhelming. On average the illumination is brighter than sunlight: concentrated into bursts, the level of each is blinding. A storm of radiation- electrons and protons pours from the pulsar outward into the nebula. No shielding imaginable would suffice to protect against it. It would be enough to shred a planet. It may even be that long ago a system of worlds did swing about the pulsar in steady orbits, but if so they would have been on fire, violently boiling under the impact of the terrible radiation. From each a vast plume of vaporised rock would have streamed outward. The planets would have looked like comets. None could have survived till now.

The pulsar is as massive as the Sun, though very much smaller- so much smaller that even from so close a telescope would still be unable to find it. As a result of its mass it exerts a force of gravitational attraction on me. I weigh something. Bit by bit I fall inward – and as I do the force of gravity increases. I fall at an ever increasing rate. At a distance of one million miles from the pulsar I am plummeting at more than 200 miles per second. At a tenth this distance gravity is so strong it pulls a pea with a force of one pound, and the rate of fall has built to 800 miles per second. A steady flow of X-rays is pouring outward. It grows stronger as I plummet, as does the radiation level and the brilliance of the light. Ten thousand miles up, the attraction on the pea is a hundred pounds and my speed is more than 2000 miles per second. Within the time it takes to read this sentence I have dropped to a thousand miles altitude. There is a powerful magnetic field. It is fluctuating violently – it is rotating precisely in step with the pulsar beacons. I am enveloped in cosmic fire: superheated plasma intense electric currents. Massive lightning strokes flare against me. Somewhere within this region the spinning searchlight beacons originate. The force on the pea is now 5 tons.

There are now one thousand miles left to be covered to the pulsar, which is still invisible, and I am going to travel this distance, whether I like it or not, in an eighth of a second. Everything happens at once. I am violently accelerated to a sizeable fraction of the velocity of light in my fall. Things ahead are blue, things behind red. The rotating magnetic field grows to such unthinkable intensities that atoms are deformed. Unfamiliar effects of gravitation come into play: my body is stretched geometry is distorted and the paths of light rays bent.

And then the object of this journey and the cause of everything I have experienced bursts into view. There is perhaps a thousandth of a second in which to view it before I rush past. So enormous is my speed by this point that no engine imaginable could alter in the slightest my headlong rush.

It is a magnet, the strongest known to exist, quite possibly the strongest magnet that does exist anywhere in the universe. Ten miles in diameter, it is spherical with a surface so smooth it would take a microscope to see any irregularities. It is spinning about its axis thirty times a second, and is so hot that it glows not red hot like metal, not white like the stars, but in X-rays. It has an atmosphere a few inches thick that is violently streaming away into space.
Now I am past it. It was a neutron star.

In the above account there are two things that furnish the key to the nature of neutron stars: the stars mass was that of the Sun, but its diameter was a mere ten miles. It must have been very dense. Divide the mass by the volume to find the density.

One gets 100,000,000,000,000 times that of water.

That is an interesting number. It is the density of an atomic nucleus.

Reference: Frozen Star, George Greenstein, Macdonald & Co (publishers) Ltd 1984. ISBN 0-356-10588-1

Hope you enjoyed this little excursion,

George.