



The Official Newsletter of  
the  
**PAPAKURA RADIO  
CLUB INC.**

*July 2023*



*Winter is coming, Prepare your antennas.*



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### This Month's Meeting:

Wednesday 5<sup>th</sup> of July will be the next meeting for 2023. Following general business, we will have a Special General Meeting to confirm the new constitution, and then Martyn will be sharing stories of Green Radios on the Air, and the joys of Amplitude Modulation.

There will be a cuppa and biscuit afterwards so we can socialise, radios optional.

**If transport is a problem, let the committee members know, and we may be able to assist with arranging a ride for you.**

Dates: Wednesday 5<sup>th</sup> June  
Wednesday 12<sup>th</sup> May  
Wednesday 19<sup>th</sup> May  
Wednesday 26<sup>th</sup> May

General Meeting + SGM  
Activity Night – Introduction to IRLP  
Committee Meeting  
Project Night

## **CLUB ACTIVITY:**

Keep an ear out for some new callsigns, as they seek those first 50 contacts, it's been good to hear so many on the repeaters.

## **NOTICE OF SPECIAL GENERAL MEETING:**

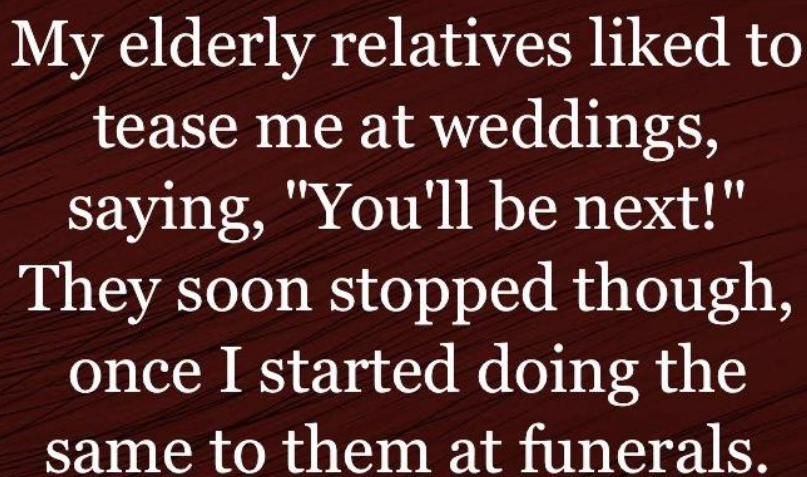
Notice is hereby given of a special General Meeting to be held at the ZL1VK clubrooms Wellington Park, 1 Great South Road, Papakura on Wednesday the 5<sup>th</sup> of July 2023.

The only item on the agenda is a number of small changes to the club constitution.

These changes are required for three reasons.

1. To change banking and signatory requirements from the days of cheques to facilitate modern internet banking
2. To include required wording to meet requirements of the incorporated societies act & IRD to confirm the Not-for-Profit status of the club.
3. Minor changes to wording to bring the document language up to date, and clarify the position of life members.

Copies of the constitution changes will be circulated to all financial members prior to the meeting.



My elderly relatives liked to  
tease me at weddings,  
saying, "You'll be next!"  
They soon stopped though,  
once I started doing the  
same to them at funerals.

# DX CALENDAR MAY 2023

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
<a href="#">7Q7W</a> <a href="#">W</a>											<a href="#">W1AW/KH8</a>											<a href="#">OY/SP7VC</a>				<a href="#">TF/SP7VC</a> <a href="#">TF/SQ7OYL</a>											
<a href="#">C6ADX C6AYL</a>											<a href="#">8Q7HU</a>											<a href="#">TG4/KT8X</a>															
<a href="#">FP/KV1J</a>																			<a href="#">JG8NOJ/JD1</a>																		
						<a href="#">PJ5C</a>																															
<a href="#">4W6RU</a>																																					
			<a href="#">KH8RRC</a>																																		
<a href="#">TR8CR</a>																																					
<a href="#">FO.F6BCW</a>																																					
<a href="#">VK0AW</a>																																					
<a href="#">FH4VVK</a>																																					

## Featured DX

### KH8RRC TUTUILA ISLAND AMERICAN SAMOA

KH8RRC Team will be active from Tutuila Island, American Samoa, IOTA OC - 045, 4 - 18 July 2023.

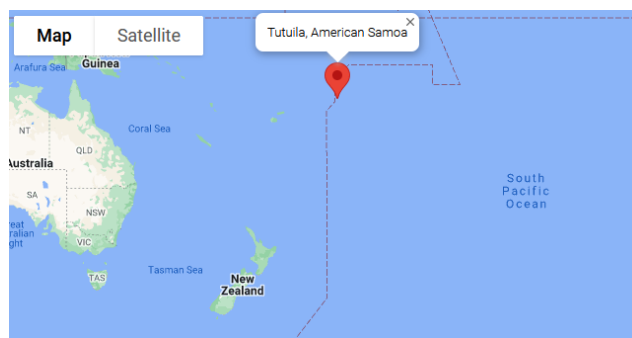
Team - N3QQ, KB2FMH, W8HC.

They will operate on HF Bands.

They planning to active some POTA references.

QTH Locator - AH45pr.

American Samoa is a strikingly beautiful nature, with strong national colour, a simple and modest life, friendly people and many other pleasant details. So think those who know about the existence of this country. If you are among these lucky few, you probably agree with the sentence above. If not, that's no problem: we'll be happy to tell you what this country is, how not to confuse it with another Samoa, what it's worth going there for and how to return back afterwards.



# UPCOMING CONTESTS

Start - Finish		Date-Time		Bands	Contest Name	Mode	Exchange	Sponsor's Website
Date	Time	Date	Time					
1	0000	1	2359	1.8-28, 50, 144	RAC Canada Day Contest	CW, Ph	RS(T), VE province/territory or serial	<a href="http://www.rac.ca">www.rac.ca</a>
1	0000	1	2359	1.8-28	Venezuelan Ind. Day Contest	CW, Ph, Dig	RS(T), serial	<a href="http://radioclubvenezolano.org">radioclubvenezolano.org</a>
1	0800	2	1100	3.5	NZART Memorial Contest	CW, Ph	RS(T), serial	<a href="http://www.nzart.org.nz/activities/">www.nzart.org.nz/activities/</a>
1	1400	2	1400	1.8-28	Marconi Memorial HF Contest	CW	RST, serial	<a href="http://www.arifano.it">www.arifano.it</a>
1	1500	2	1500	3.5-14	Original QRP Contest	CW, Ph	RST, serial, pwr	<a href="http://www.qrpcc.de">www.qrpcc.de</a>
3	1900	3	2030	3.5	RSGB 80m Club Champ, CW	CW	RST, serial	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
4	0100	4	0300	3.5-28	ARS Spartan Sprint	CW	RST, SPC, pwr	<a href="http://arsqrp.blogspot.com">arsqrp.blogspot.com</a>
5	1700	5	2100	144	VHF-UHF FT8 Activity Contest	FT8	4-char grid	<a href="http://www.ft8activity.eu">www.ft8activity.eu</a>
6	0000	7	0300	7	Walk for the Bacon QRP Contest	CW	RST, SPC, name, mbr or pwr; 13 WPM max	<a href="http://qrptest.com/pigwalk40">qrptest.com/pigwalk40</a>
6	1700	6	2100	28	NRAU 10m Activity Contest	CW, Ph, Dig	RS(T), 6-char grid	<a href="http://nrau.net">nrau.net</a>
6	2000	6	2200	1.8-28, 50	SKCC Sprint Europe	CW	RST, SPC, name, mbr or "none"	<a href="http://www.skccgroup.com">www.skccgroup.com</a>
7	0145	7	0215	see rules	NCCC RTTY Sprint	Dig	Serial, name, QTH	<a href="http://ncccsprint.com/rttyns.html">ncccsprint.com/rttyns.html</a>
7	0230	7	0300	see rules	NCCC Sprint	CW	Serial, name, QTH	<a href="http://ncccsprint.com/rules.html">ncccsprint.com/rules.html</a>
8	1200	9	1200	1.8-28	IARU HF World Championship	CW, Ph	RS(T), IARU HQ soc or ITU zone	<a href="http://www.arri.org/iaru-hf-world-championship">www.arri.org/iaru-hf-world-championship</a>
8	1200	9	2359	1.8-28, 50	SKCC Weekend Sprintathon	CW	RST, SPC, name, mbr or "none"	<a href="http://www.skccgroup.com">www.skccgroup.com</a>
8	2000	9	2000	7	PODXS 070 Club 40m Firecracker Sprint	Dig	RST, SPC	<a href="http://www.podxs070.com">www.podxs070.com</a>
9	2000	9	2300	1.8-28	QRP ARCI Summer Homebrew Sprint	CW	RST, SPC, mbr or pwr	<a href="http://qrparci.org">qrparci.org</a>
10	0000	10	0200	1.8-28	4 States QRP Group 2nd Sunday Sprint	CW, Ph	RS(T), SPC, mbr or pwr	<a href="http://www.4sqrp.com">www.4sqrp.com</a>
12	1700	12	2100	432	VHF-UHF FT8 Activity Contest	FT8	4-char grid	<a href="http://www.ft8activity.eu">www.ft8activity.eu</a>
12	1900	12	2030	3.5	RSGB 80m Club Champ, SSB	Ph	RS, serial	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
13	1900	13	2000	3.5, 7	EACW Meeting	CW	RST, mbr, nickname; EA province or DXCC prefix	<a href="http://www.eacwspain.es">www.eacwspain.es</a>
14	0145	14	0215	see rules	NCCC RTTY Sprint	Dig	Serial, name, QTH	<a href="http://ncccsprint.com/rttyns.html">ncccsprint.com/rttyns.html</a>
14	0230	14	0300	see rules	NCCC Sprint	CW	Serial, name, QTH	<a href="http://ncccsprint.com/rules.html">ncccsprint.com/rules.html</a>
15	0700	15	1459	7, 14, 21, 28	Russian Radio Team Championship	CW, Ph	RS(T), mbr code or ITU zone	<a href="http://srr.ru">srr.ru</a>
15	0800	15	1400	1.8-7	Trans-Tasman Low-Bands Challenge	CW, Ph, Dig	RS(T), serial	<a href="http://www.wia.org.au">www.wia.org.au</a>
15	1400	16	1400	70	IARU Region 1 70 MHz Contest	CW, Ph	RS(T), serial, 6-char grid	<a href="http://www.iaru-r1.org">www.iaru-r1.org</a>
15	1800	16	2100	50, 144	CQ Worldwide VHF Contest	CW, Ph, Dig	4-char grid	<a href="http://www.cqww-vhf.com">www.cqww-vhf.com</a>
16	0900	16	1600	3.5-14	RSGB Int'l Low Power Contest	CW	RST, serial, pwr	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
16	2000	16	2159	14	CQC Great Colorado Gold Rush	CW	RST, SPC	<a href="http://www.coloradoqrclub.org">www.coloradoqrclub.org</a>
16	2300	17	0100	1.8-28	Run for the Bacon QRP Contest	CW	RST, SPC, mbr or pwr	<a href="http://qrptest.com/pigrun">qrptest.com/pigrun</a>
17	1900	17	2030	3.5-14	RSGB FT4 Contest	FT4	Signal report, 4-char grid	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
19	1700	19	2100	1.2G	VHF-UHF FT8 Activity Contest	FT8	4-char grid	<a href="http://www.ft8activity.eu">www.ft8activity.eu</a>
20	0030	20	0230	3.5-14	NAQCC CW Sprint	CW	RST, SPC, mbr or pwr	<a href="http://naqcc.info">naqcc.info</a>
20	1900	20	2000	3.5-14	NTC QSO Party	CW	RST, mbr, or "NM"; 25 WPM max	<a href="http://pi4ntc.nl">pi4ntc.nl</a>
21	0145	21	0215	see rules	NCCC RTTY Sprint	Dig	Serial, name, QTH	<a href="http://ncccsprint.com/rttyns.html">ncccsprint.com/rttyns.html</a>
21	0230	21	0300	see rules	NCCC Sprint	CW	Serial, name, QTH	<a href="http://ncccsprint.com/rules.html">ncccsprint.com/rules.html</a>
22	0000	22	2359	50	ARAM 50 MHz Contest	CW, Ph	RS(T), serial, 6-char grid	<a href="http://www.aram.pt">www.aram.pt</a>
22	0000	30	2359	1.8-28	Maidenhead Mayhem Contest	CW, Ph, Dig	2-char grid	<a href="http://w9et.com/rules.html">w9et.com/rules.html</a>
22	1000	22	2159	3.5-28	YOTA Contest	CW, Ph	RS(T), age	<a href="http://www.ham-yota.com/contest">www.ham-yota.com/contest</a>
26	0000	26	0200	1.8-28, 50	SKCC Sprint	CW	RST, SPC, name, mbr or "none"	<a href="http://www.skccgroup.com">www.skccgroup.com</a>
27	1900	27	2030	3.5	RSGB 80m Club Champ, Data	Dig	RST, serial	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
28	0145	28	0215	see rules	NCCC RTTY Sprint	Dig	Serial, name, QTH	<a href="http://ncccsprint.com/rttyns.html">ncccsprint.com/rttyns.html</a>
28	0230	28	0300	see rules	NCCC Sprint	CW	Serial, name, QTH	<a href="http://ncccsprint.com/rules.html">ncccsprint.com/rules.html</a>
29	0000	30	2359	1.8-28, 50, 144	MARAC US Counties QSO Party	CW, Ph	RS(T), SC or "DX"	<a href="http://www.marac.org">www.marac.org</a>
29	1200	30	1200	3.5-28	RSGB IOTA Contest	CW, Ph	RS(T), serial, IOTA no	<a href="http://www.rsgbcc.org">www.rsgbcc.org</a>
29	1400	29	1800	144	WAB 144 MHz Low Power Phone	Ph	RS, serial, WAB square, or country	<a href="http://wab.internip.net">wab.internip.net</a>
30	1700	30	2100	7, 14, 21, 28	ARS Flight of the Bumblebees	CW	RST, SPC, pwr, or Bumblebee number	<a href="http://www.arsqrp.blogspot.com">www.arsqrp.blogspot.com</a>
31	1300	31	1400	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	<a href="http://www.qrp-labs.com/party.html">www.qrp-labs.com/party.html</a>
31	1900	31	2000	1.8-28	QCX Challenge	CW	RST, name, SPC, rig	<a href="http://www.qrp-labs.com/party.html">www.qrp-labs.com/party.html</a>

Note: All dates and times are in UTC, Mbr = Membership number. Serial = Sequential number of the contact. SPC = State, Province, DXCC Entity. XE = Mexican state.



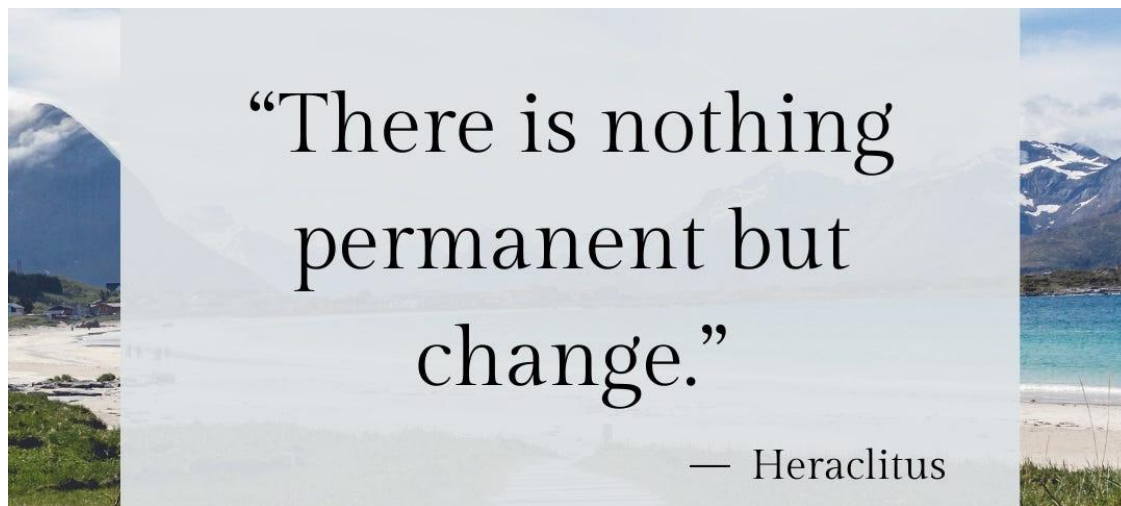
## RAMBLINGS FROM THE EDITOR'S DESK

Yes, It's July ... Yes, it's wet ... Yes, it's cold. In short, a good time to be indoors doing radio, rather than outdoors. It's hard to believe that half the year is gone, and we have already passed the shortest day.

La Nina weather patterns are changing to an El Nino pattern, and with the pattern change, we get to look forward to the cold wet winters followed by potentially a hotter drier summer. That may mean a warmer and "good-to-be-outdoors" summer but may also mean the demands on our dams could again lead to water restrictions. Not that these are predictions, just possibilities, but it's a good time to think about how we manage limited resources.

In short, the only thing we know for certain is that change is likely to happen. Change is an interesting thing, most of the time we want it, we even seek it, but as soon as it starts, we feel uncomfortable and start to seek the comfort of what we used to know. But change is inevitable and the only real constant in our world.

My life this year has been turned on its head by changes to the way apprentices and tertiary provision is to be performed, this has required that we review every programme we deliver, and change the way we deliver and assess, and even what we need to consider. But I take heart that we are not alone, I noted with some interest the decision of the NZ Ministry of Education to also drop the periodic table and other "Facts" from the new curriculum considering the criticism that India received for its similar changes. Again, Time will tell if the changes actually happen and if they turn out to be positive or negative but as expected, the draft document has caught many off guard and discussion may be lively. I'll be watching it with interest.



It's not surprising that I find myself wishing we did not have so much change, all at once, but there are also benefits. The changes to what we are doing, are making us increase our reflective practice, and ask ourselves, why we are doing what we do, and if there are better options, we have been forced to consider our content, and how we can both teach, and assess our students better. But this is not always a comfortable process, and it's sometimes hard to admit that maybe we can improve. But if we are to benefit from the process, then we must take every advantage, otherwise we will be compliant, but poorer for the experience. Change is not very comfortable, but if we take advantage of it, it can be beneficial.

There is little doubt that our club, and even our hobby is in a state of uncertainty, and many things we took for granted are less and less certain. There is some uncomfortable discussion about the state of, and future of the venerable national system, while it has served us well in the past, is it able to be maintained in the future, can we keep the network going? Should we replace it with a modern system like the DMR one? With so many digital options, what is the future of FM?

As I commented on last month, I was surprised, to find so few VHF and UHF simplex channels free to use for contacts, and it raises questions about how we use our allocated spectrum, if we are low in bandwidth for all the services we are running, but have fewer members, do we risk dividing the hobby in factions? I realise these are uncomfortable questions, but if we are to grow from the changes, then they are discussion we need to have in mature, adult ways. Change is uncomfortable.



As a club we are having to accept that we are changing, our hobby is changing. There was a time that having a ham ticket made you stand out from the crowd, when you applied for a job, the fact that you had done something different, opened doors. I personally believe it still does. Not because the hobby makes you better, but the determination to study and work to get the licence is something that makes you stand out. Going to an educational facility may be driven by your family, or your employer, but studying for something, because you wanted it, This makes you stand out.

The licence is not easy, you must work to get it, and that effort changes you. Then you must learn about the equipment, this also changes you. Putting up an antenna is not normal, it changes you. Operating procedures, Q codes, getting comfortable to talk to others who you never see, this too changes you. Your brain, is not the brain you had when you started, the process might have been gradually, but it did happen. You grew, you made all new pathways and connections in your brain, you became someone else. This is what change does, It makes up grow.

A very big part of that growth, and we as a club, and as a hobby, need this growth, is bringing in new people into the hobby, bringing new people into our clubs. Not all will stay, Not all will become active on the frequencies, some will go on to other interests, some will use it for a while, and then specialise in a part of the hobby we don't use, others with park it for a while, and come back when they have more time, but some will connect with a community, and it will resonate, and these will bring new life, new ideas and new growth to a club. But these new ideas will also be a source of change. They will see things in new ways, Yes, they will want to learn, but they will also question why? And why is a great question.

Why do we do things this way? Why does antenna height matter? Why does doubling power, not double range? Questions are how we learn, but sometimes a question is asked for which we either do not have an answer, or maybe there is no answer. The question for which I don't know the answer is great, because it makes me question, seek answers and I grow from the experience, then when I share what I have learnt they grow too, A win-win Scenario. But the question that has no answer, that makes me uncomfortable, because I know it's a habit ... a preference ... an "It's always been done this way" and questioning it makes me uncomfortable. It makes me choose either my comfort, or to open my mind to a new possibility an idea that there might be another way. These ideas are scary, ideas like this bring about change, and change is uncomfortable.

**"If you're serious about change, you have to go through uncomfortable situations & stop trying to dodge the process. It's the only way to grow."**

-- Unknown



As we move through this cold winter, and as we help our new hams get up and running, and maybe, as we consider who might be joining our next ham cram, and how we find and connect with them. Maybe it's a good time to pause, and let the universe remind us that change is life, and life is change. We don't have to adopt or embrace every change. I for one find FT8 as exciting as watching paint dry, but if I am to connect with some of the hams who live on I, I may need to dabble occasionally, and if not ... Its ok, but if they enjoy it, who am I to deprive them of that pleasure? The hobby is big enough that we can all co-exist.

As we journey through the changing seasons of winter, and after that spring, and then into a new summer, as we will experience change, and as our hobby changes and grows, and maybe has to let go of some of the past, not all, as there will be those who will keep it in memory and keep it alive, like AM and even old hardware, we will also embrace new technologies and new challenges. But we will grow and adapt, and we may very well be led into these new seasons by those new to the hobby. But it will be those who embrace change who will thrive, and the change will grow us.

So, as we settle into the comfort of a warm house for the winter, lets also consider, what the coming seasons, and the coming challenges will mean for us, and let's build a better stronger hobby, by allowing the changes to grow us. But lets us also temper that change with respect and gratefulness to those who pioneered the way before us and made it possible to enjoy this great hobby of ham radio.

Yes This is the one time, we can have our cake and eat it too. The hobby is big enough for us all to find our own way to enjoy it.

It's food for thought.

73 de ZL1NUX



## THE MAGICAL MATERIAL THAT BLOCKS MICROWAVES AND INFRARED HEAT ALSO SHIFTS FROM TRANSPARENT TO TRANSLUCENT

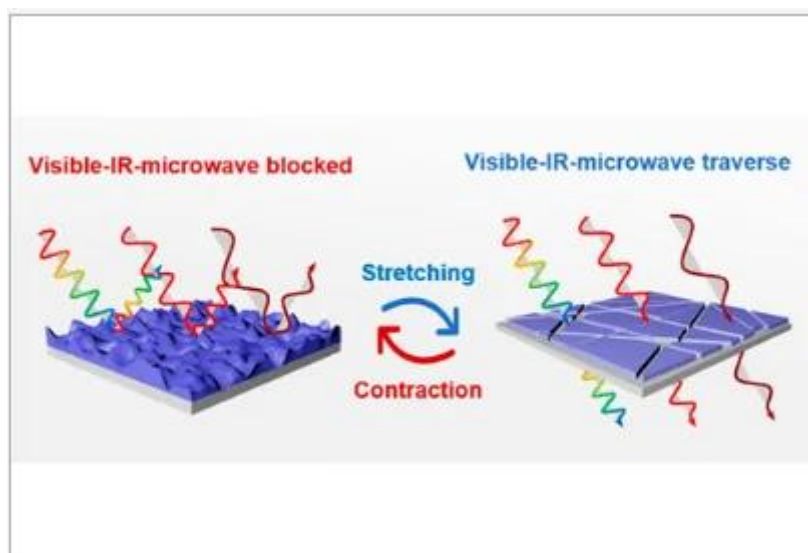
A seemingly magical material can block microwaves, infrared (IR) heat, and light and then magically shift to a transparent state that also allows IR and microwaves to pass through simply by being stretched or contracted.

Inspired by the properties of squid skin, which can shift from translucent to opaque due to the presence of iridocytes and chromatophores, the new material could help create stealth materials, safeguard electronic devices, dramatically improve energy efficiency in commercial buildings, and even protect against microwave weapons.

A team of Chinese researchers says they have combined the benefits of many different cutting-edge materials into one super material that can be commanded to block light, IR, microwaves, and other EM emissions or let them through.

To develop their magic material, the team first looked at current methods in use to imbue these particular properties into a substrate of glass and other materials. They quickly determined that windows that can shift between transparent and opaque states typically embed tiny structures within the glass that wrinkle under an electric current. Separately, materials that successfully block EM and IR emissions often employ microscopic silver nanowires embedded into a base material.

With this knowledge in hand, the team created a two-layer film by spraying a thin layer of silver nanowires onto a stretched elastomer. Next, they stretched and contracted the material thoroughly to create tiny cracks and wrinkles on the material's surface.



*Image Credit: Leilei Liang, Ruoling Yu, Samuel Jun Hoong Ong, Yi Yang, Baoshan Zhang, Guangbin Ji, and Zhichuan J. Xu.*

After some trial and error, the researchers found what they were hoping for. When their new material was contracted to a -30% strain, “it blocked light, trapped infrared heat and shielded up to 99.9% of microwaves.”

Then the team stretched the material back out and found that “the expansion was directly related to an increase in optical transparency and heat and microwaves it transmitted.”

Published in ACS Nano, which is the journal of the American Chemical Society, the team says there are many potential applications for their new material. Some of those include:

- Transmitting or blocking wireless electrocardiography signals.
- As a blanket to trap body heat or allow it to escape.
- For tracking movements because the materials produce temperature changes that are detectable by infrared cameras.

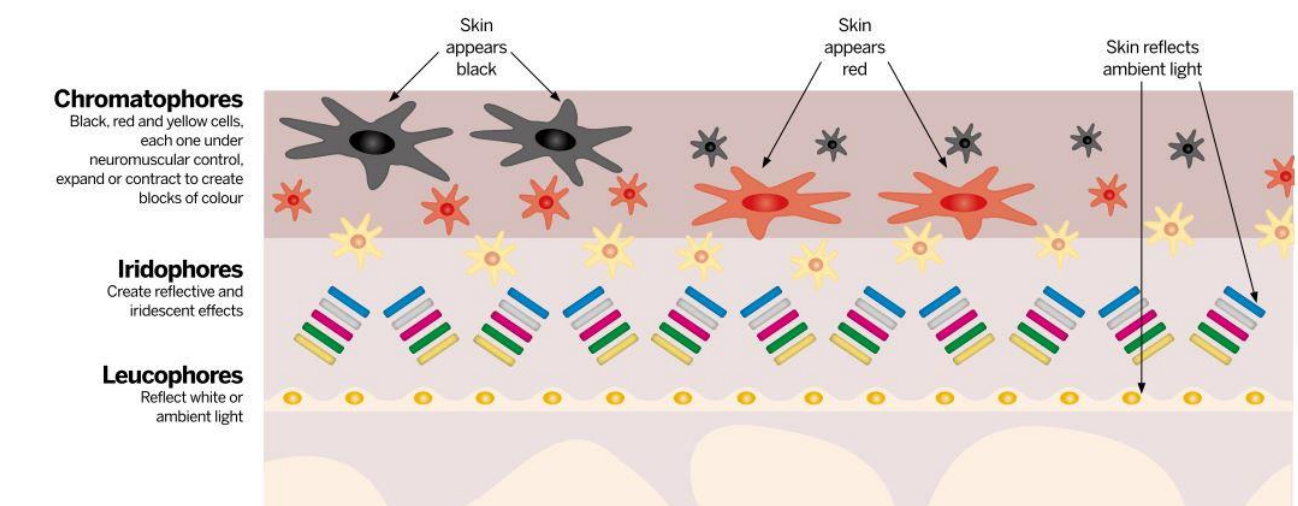
The team also notes that their system’s ability to modify its transparency repeatedly and rapidly “could benefit dynamic camouflage technologies, energy-efficient buildings, and adaptive personal and healthcare devices.”

Along with these listed applications, such material could theoretically be used to safeguard people against weapons using microwaves that are increasingly under development by militaries around the world and which some theorize could be behind the so-called “Havanna Syndrome” attacks that have often plagued American diplomats serving overseas.

But no matter how this magical material is ultimately used, its original inspiration may be one more reason to think that squids and octopuses are truly out of this world.

## THE REMARKABLE SKIN OF THE CEPHALOPOD

Fig. 1: Cephalopod skin contains layers of pigment-producing and reflective cells, many of which are under direct neural control



# THE UNIVERSE IS EXPANDING IN WAYS WE DON'T UNDERSTAND... OR IS IT.

How we know it is expanding:

All known elements emit and absorb particular wavelengths of light, which is part of the electromagnetic spectrum. By studying the wavelengths of light (as indicated by 'lines' within the electromagnetic spectrum) emitted by an object in space, astronomers can get a range of information. One thing they examine is the change in position of lines in the spectrum from a star—this can tell astronomers how far away the star is, whether it is moving towards or away from us and how fast it is moving.

When looking at the radiation emitted by distant stars or galaxies, scientists see emission spectra 'shifted' towards the red end of the electromagnetic spectrum—the observed wavelengths are longer than expected. Something causes the wavelength of the radiation to 'stretch'. But rather than an actual change in the wavelength, this phenomenon was something similar to the Doppler effect—they only appear stretched relative to the observer. The further away an object is, the greater the shift.

## THE DOPPLER EFFECT

The noise of a siren or a car speeding past sounds higher in pitch the closer it gets to you and lower as it moves away. This is called the Doppler effect, where waves, in this case, sound waves, change in frequency and wavelength as the source moves towards you (higher frequency, shorter wavelength) or away from you (lower frequency, longer wavelength). There is no actual change in sound; the car isn't making a different noise. It just sounds different due to the car's movement relative to you.

## DOPPLER SHIFT

This apparent change in wavelength can also be observed for the visible light emitted by stars or galaxies. So, if a star is moving towards Earth, it appears to emit light that is shorter in wavelength compared to a source of light that isn't moving. Because shorter wavelengths correspond to a shift towards the blue end of the spectrum, this is called blueshift. In contrast, the light from a star moving away from us seems to shift towards longer wavelengths. As this is towards the red end of the spectrum, astronomers call it redshift.



*Diagram illustrating redshift*

Top: the light spectrum of an object at rest. Bottom: the light spectrum of that object moving away from you. Notice how the lines shift towards the red end of the spectrum.

The degree of shift can also give astronomers information about how fast the object is moving relative to us. A faster-moving object has a greater shift in wavelength.

Using various measures to establish how far away the galaxies were, Edwin Hubble (and those that followed him) found that their velocity was always proportional to their distance. The ratio of the two became the famous 'Hubble constant' and represents the expansion rate of the universe. But is the expansion rate really constant? Apparently not ... and that's where dark energy comes in.

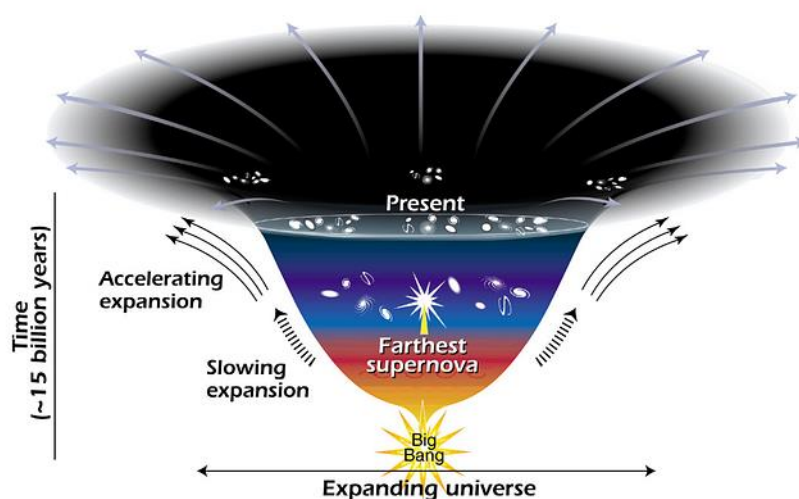
## BUT ...

Astronomers using NASA's Hubble Space Telescope say they have crossed an important threshold in revealing a discrepancy between the two key techniques for measuring the universe's expansion rate. The recent study strengthens the case that new theories may be needed to explain the forces that have shaped the cosmos.

Hubble measurements suggest a faster expansion rate in the modern universe than expected, based on how the universe appeared more than 13 billion years ago. These measurements of the early universe come from the European Space Agency's Planck satellite. This discrepancy has been identified in scientific papers over the last several years, but it has been unclear whether differences in measurement techniques are to blame, or whether the difference could result from unlucky measurements.

The latest Hubble data lower the possibility that the discrepancy is only a fluke to 1 in 100,000. This is a significant gain from an earlier estimate, less than a year ago, of a chance of 1 in 3,000.

These most precise Hubble measurements to date bolster the idea that new physics may be needed to explain the mismatch.



"The Hubble tension between the early and late universe may be the most exciting development in cosmology in decades," said lead researcher and Nobel laureate Adam Riess of the Space Telescope Science Institute (STScI) and Johns Hopkins University, in Baltimore, Maryland. "This mismatch has been growing and has now reached a point that is really impossible to dismiss as a fluke. This disparity could not plausibly occur just by chance."



One explanation for the mismatch involves an unexpected appearance of dark energy in the young universe, which is thought to now comprise 70% of the universe's contents. Proposed by astronomers at Johns Hopkins, the theory is dubbed "early dark energy," and suggests that the universe evolved like a three-act play.

Astronomers have already hypothesized that dark energy existed during the first seconds after the big bang and pushed matter throughout space, starting the initial expansion. Dark energy may also be the reason for the universe's accelerated expansion today. The new theory suggests that there was a third dark-energy episode not long after the big bang, which expanded the universe faster than astronomers had predicted. The existence of this "early dark energy" could account for the tension between the two Hubble constant values, Riess said.

Another idea is that the universe contains a new subatomic particle that travels close to the speed of light. Such speedy particles are collectively called "dark radiation" and include previously known particles like neutrinos, which are created in nuclear reactions and radioactive decay.

Yet another attractive possibility is that dark matter (an invisible form of matter not made up of protons, neutrons, and electrons) interacts more strongly with normal matter or radiation than previously assumed.

But the true explanation is still a mystery.

## **BUT MAYBE EINSTEIN HAD THE ANSWER.**

The nature of dark matter is a longstanding puzzle. However, a new study by Alfred Amruth at the University of Hong Kong and colleagues, published in *Nature Astronomy*, uses the gravitational bending of light – Einstein rings – to bring us a step closer to understanding.

Invisible but omnipresent

The reason we think dark matter exists is that we can see the effects of its gravity in the behaviour of galaxies. Specifically, dark matter seems to make up about 85% of the universe's mass. And most of the distant galaxies we can see appear to be surrounded by a halo of the mystery substance.

But it's called dark matter because it doesn't give off light, or absorb or reflect it, which makes it incredibly difficult to detect.

So what is this stuff? We think it must be some kind of unknown fundamental particle, but beyond that, we're not sure. All attempts to detect dark matter particles in laboratory experiments so far have failed. Physicists have been debating its nature for decades.

Scientists have proposed two leading hypothetical candidates for dark matter. One possibility is a relatively heavy character called weakly interacting massive particles (or WIMPs). And the other possibility is that of extremely lightweight particles called axions. In theory, WIMPs would behave like discrete particles. Meanwhile, axions would behave a lot more like waves due to quantum interference.

It's been difficult to distinguish between these two possibilities. But now, light bent around distant galaxies has offered a clue.

## GRAVITATIONAL LENSING AND EINSTEIN RINGS

When light travelling through the universe passes a massive object like a galaxy, its path is bent. It bends because – according to Albert Einstein’s theory of general relativity – the gravity of the massive object distorts space and time around itself.

So, sometimes when we look at a distant galaxy we can see distorted images of other galaxies behind it. And if things line up perfectly, the light from the background galaxy will be smeared out into a circle around the closer galaxy.

This distortion of light is gravitational lensing. And the circles it can create are Einstein rings.

By studying the distortion of the rings or other lensed images, astronomers can learn about the properties of the dark-matter halo surrounding the closer galaxy.

## AXIONS VS WIMPS

And that’s exactly what a team of astrophysicists have done in a new study. They looked at several systems where multiple copies of the same background object appeared around the foreground lensing galaxy, with a special focus on HS 0810+2554.



Using detailed modelling, they worked out how the images would be distorted if dark matter were made of WIMPs versus axions. The WIMP model didn’t look much like the real thing, but the axion model accurately reproduced all features of the system.

The result suggests axions are a more probable candidate for dark matter. And their ability to explain lensing anomalies and other astrophysical observations has scientists buzzing with excitement.

The new research builds on previous studies that have also pointed toward axions as the more likely form of dark matter. For example, one study looked at the effects of axion dark matter on the cosmic microwave background. And another examined the behaviour of dark matter in dwarf galaxies.

This research won't yet end the scientific debate over the nature of dark matter. But it does open new avenues for testing and experiment. For example, scientists could use future gravitational lensing observations to probe the wave-like nature of axions and potentially measure their mass.

A better understanding of dark matter will have implications for what we know about particle physics and the early universe. It could also help us to understand better how galaxies form and change over time.

So it looks like a settled debate ... Except ...

## **THE UNIVERSE'S EXPANSION MAY BE AN ILLUSION.**

A new theoretical physics study suggests that the expansion of the universe may be an illusion — a controversial new mathematical model that could shed light on the nature of dark matter.

The University of Geneva theoretical physicist and author Lucas Lombriser said his new hypothesis takes a fresh look at the long-established theory surrounding the accelerating expansion of the universe.

"In this work," Lombriser says, "we put on a new pair of glasses to look at the cosmos and its unsolved puzzles by performing a mathematical transformation of the physical laws that govern it. I was surprised that the cosmological constant problem simply seems to disappear in this new perspective on the cosmos."

## **REDSHIFT, GREEN LIGHT**

Longstanding hypotheses suggest that redshift — the stretching of light wavelengths toward the redder end of the colour spectrum as an object moves away from the viewer — is an indicator of an expanding universe because further-off galaxies have higher redshift than those closer to us.

More recently, astrophysicists have hypothesized that the rate of universal expansion is accelerating — a process that's denoted as the cosmological constant or  $\lambda$ .

$\lambda$ , however, has been a problematic concept since Albert Einstein described it more than 100 years ago because observations don't match up with astrophysicists' predictions, leading them to propose new particles or forces to explain the discrepancy.

Lombriser, however, suggests that Einstein may have been right the first time before coming up with the cosmological constant when he argued that the universe is flat and static.

The astrophysicist suggests that particles are the ones changing in mass, accounting for the difference in redshift — and not the expansion of the universe.

When it comes to explaining dark matter, which is believed to make up 80 percent of the mass of the universe, but can't be observed directly, Lombriser's study suggests that the strange material could work like an axion field, a hypothetical particle that's considered one of the top contenders for dark matter's identity.

Fluctuations in this field could even mean "there is, in principle, no need for dark energy," Lombriser theorises referring to the mysterious force that drives galaxies apart at an accelerating rate. If these fluctuations shift the light, we may be seeking an answer to the wrong problem.

The theory may seem somewhat outlandish given how well-established the expanding universe theory is, but seeing how much trouble the cosmological constant has caused, it's probably worth considering.

One of the benefits of this new model is as it reproduces the observable success of standard cosmology, but with no cosmological constant problem and one less free parameter — meaning, Lombriser suggests, that it is more statistically favourable.

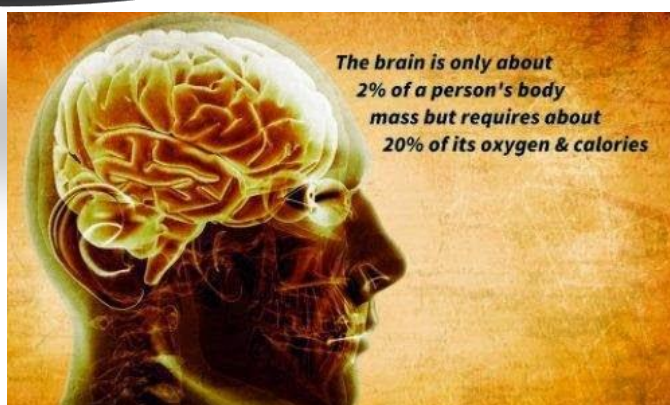
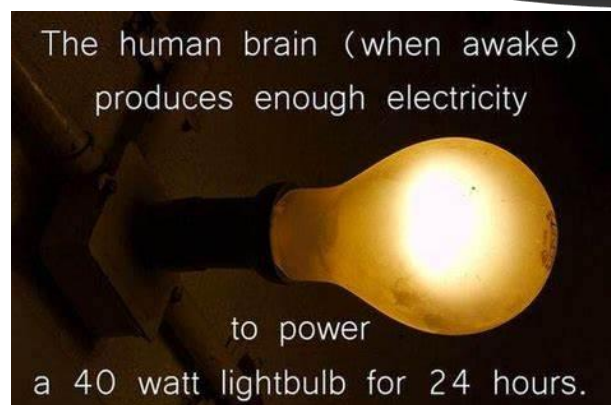
The model may also benefit from the fact that the course of science rarely runs smoothly, thus meaning other cosmologists may find appealing concepts in Lombriser's work to build their own models upon.

Time will only tell if Lombriser's theory will bear fruit. If indeed, he has hit on the correct mechanism that will finally untangle the problems with the cosmological constant. Even if this is the case, it may plant seeds for more questions.

After all, if we ever hope to answer the really big questions of the universe, we may need to expand our thinking. After all,... That's where the real science happens.

We are all time travellers, journeying together into the future. But let us work together to make that future a place we want to visit."

Stephen Hawking



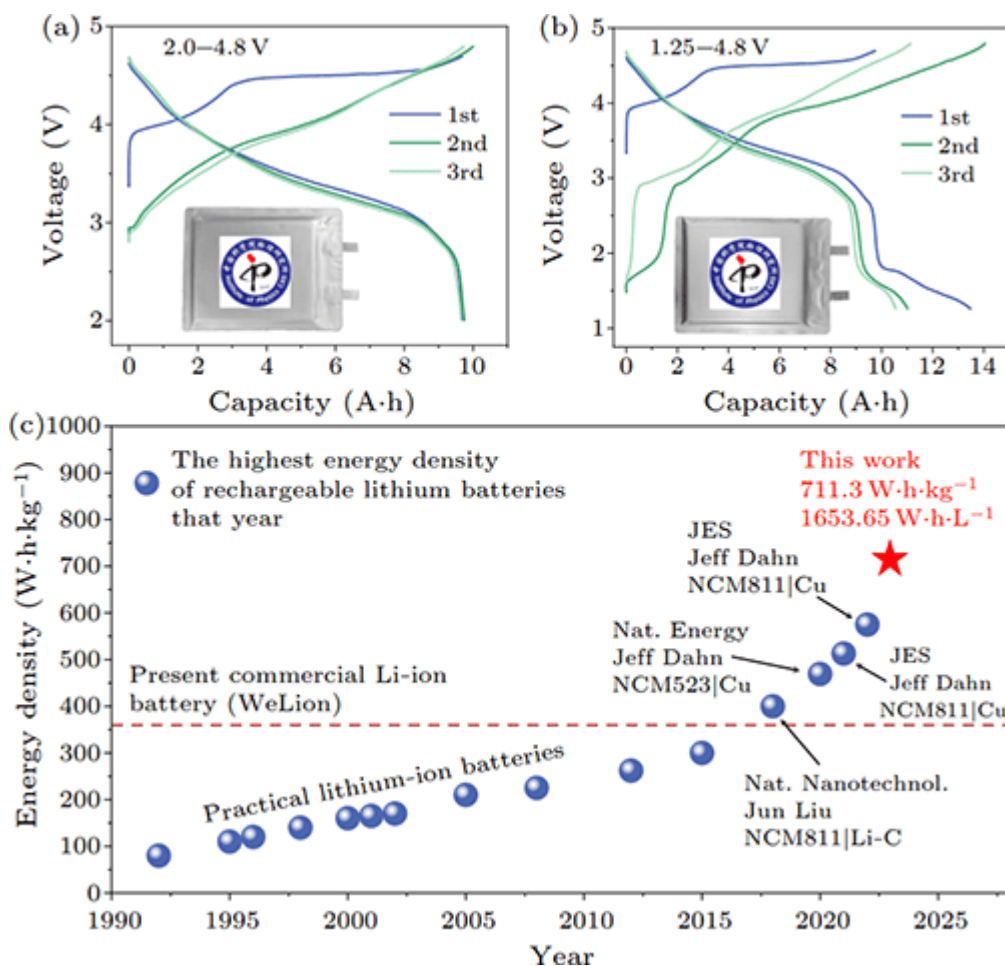


# RECORD BREAKING 711 WH/KG ENERGY DENSITY BATTERY BREAKTHROUGH

Researchers at the Institute of Physics, Chinese Academy of Sciences, have made a breakthrough in battery technology by developing a battery pack with an incredible energy density of 711 Wh/kg, tripling Tesla's current energy density.

By employing innovative strategies such as broadening lithium-rich manganese-based oxides' charge and discharge potential, overcoming challenges with ultra-thin lithium large-area capacity deposition, and implementing thick electrodes, optimized electrolytes, and ultra-thin collectors, the team achieved this groundbreaking feat. This advancement could have a significant impact on industries such as high altitude, deep space, and electric aviation.

The development of batteries with ultra-high energy density has significant potential for various special application scenarios such as high altitude, deep space, and the electric aviation industry. However, it is important to note that further research and development work is needed to address issues related to battery safety and lifespan. Despite this, the achievements made by Chinese researchers in developing this ultra-high energy density soft pack lithium secondary battery mark a significant step forward in the pursuit of more efficient and powerful energy storage solutions.



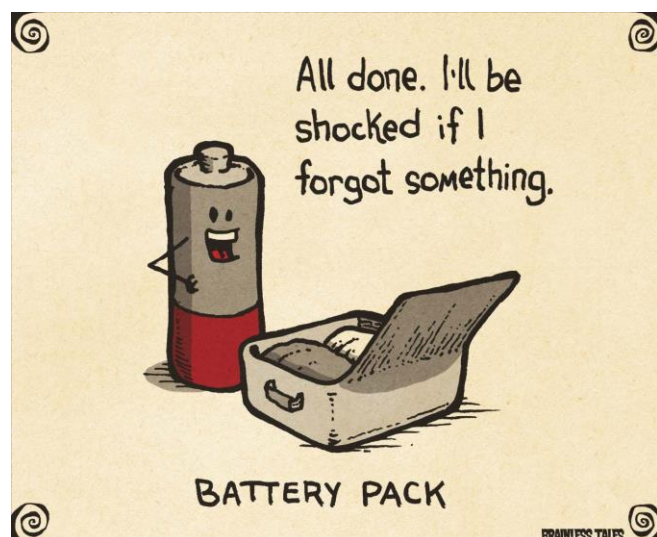
The progress in battery technology will not only have far-reaching implications for meeting the demands of different industries but also contribute to the advancement of solid-state ionics and solid-state electrochemistry. Exploratory research focusing on energy density levels approaching the theoretical limit will enrich the knowledge system in these fields and promote technological innovations in new materials and battery systems.

## Impact on industries and the future of energy storage

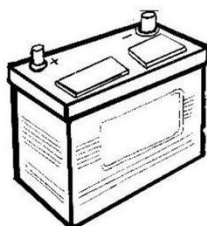
The breakthrough in energy density achieved by Chinese researchers signifies a significant step towards more efficient and powerful energy storage solutions. Although challenges related to battery safety, lifespan, and further improvements in energy density remain, the advancements in battery technology hold tremendous potential for driving the transition towards a more electrified future.

With the potential to triple Tesla's current energy density, this breakthrough could have a transformative impact on the electric vehicle industry, improving range and performance while potentially reducing costs. It could also open doors to new possibilities in other sectors, such as renewable energy storage, helping to further propel the shift towards a greener, more sustainable future.

And maybe a lighter, longer-lasting SOTA battery.



**For Sale.  
Old batteries.  
Free of charge.**



## HEARD AROUND THE SCENES

### **WHANGAREI AMATEUR RADIO CLUB ANNUAL USED EQUIPMENT SALE:**

To be held at Whangarei Branch Clubrooms, Heritage Park Whangarei on Saturday 23 July 2023

- Doors open for sellers at 9am and buyers at 10am
- sausages, sandwiches, cakes, tea and coffee on sale
- Auckland VHF group will be attending with a selection from their trading table.
- A large amount of good gear including electronic components will be on offer.
- Bookings for a (900mm) sales table at \$10 available contact Paul ZL1PC 021 926 952

NB There will be a sit-down hamburger meal at 5pm. Make your own with supplied ingredients. \$6 each. BYO drinks.

Names to Rose Deverell ZL1WRD please.

RWB Communications master agents for Icom, will be attending too. We look forward to seeing you at this friendly social event. You might even find a bargain to add to your existing collection!

### **2023 IARU HF WORLD CHAMPIONSHIP CONTEST (JULY)**

The 2023 IARU HF World Championship Contest takes place the second full weekend of July, beginning 1200 UTC Saturday and ending 1200 UTC Sunday (8-9 July 2023).

Both Single and Multi operator stations may operate the entire 24-hour period.

All licensed amateurs worldwide are eligible to participate in this contest.

The objective of this contest is to contact as many other amateurs as possible, especially IARU member society HQ stations, around the world using the 160, 80, 40, 20, 15 and 10 meter bands.

Multipliers are the total number of ITU zones plus IARU member society HQ stations worked on each band (not mode).

Thus, your Society's HQ stations participation is very important for the multipliers.

IARU officials represent a maximum of four multipliers per band (AC, R1, R2 and R3).

Our two regional AC members have the option of using "AC" or our regional designator "R3".

Regional EC members who are not AC members must use our designator "R3".

You can find the complete rules at; <http://www.arrl.org/iaru-hf-world-championship>

Enjoy and good luck!

## INTERNATIONAL LIGHTHOUSE LIGHTSHIP WEEKEND. (AUGUST)

This year 00.01UTC 19th August to 24.00UTC 20th August 2023 (48 hours)

The major event which takes place in August is the International Lighthouse Lightship Weekend, ILLW, which came into being in 1998 as the Scottish Northern Lights Award run by the Ayr Amateur Radio Group. The history of this event can be found elsewhere on [the ILLW site](#).

The ILLW usually takes place on the 3rd full weekend in August each year and attracts over 500 lighthouse entries located in over 40 countries. It is one of the most popular international amateur radio events in existence probably because there are very few rules and it is not the usual contest type event.

It is also free and there are no prizes for contacting large numbers of other stations. There is little doubt that the month of August has become "Lighthouse Month" due largely to the popularity and growth of the ILLW.

## THE NEXT OFFICIAL BROADCAST WILL BE HELD SUNDAY 30TH JULY 2023 AT 8:00 PM.

It will be rebroadcast in the Auckland area on the 6625 Repeater, available on the NZART website: [NZART-Official Broadcast](#)



and is





## SOME NETS – FOR WHEN YOU ARE LOOKING FOR SOME COMPANY

Day	Time (Local)	Freq (MHz)	Group
Sunday	08:00	3.750	Southern Net
	09:00	3.700	Bch 10. Franklin.
	09:15	3.755	Bch 65. Papakura.
	19:00	146.700	YL Net
	20:00	3.710	Bch 42. Titahi Bay
	21:30	3.595	Duran WIA Net.
Monday	19:30	3.757	Bch 12. Hamilton
	20:00	3.540	CW Practice Net
	20:00	3.605	Br 80. Hibiscus Coast
	20:00	Nat System	W.A.R.O
	20:30	3.870	O.T.C (Old Timers Club)
Tuesday	09:00	7.096	Ex Post Office Techs
	21:00	1.850	160m Net _ Ron ZL4JMF
	19:30	3.690	QRP ZL2BH
	20:00	3.581	CW improvers Net
Wednesday	11:30	3.850	SPAM Net
	20:00	3.660	Geek Net
	20:00	3.645	Bch 02. Auckland
	20:00	3.745	Bch 84. Bay of Islands
	20:30	146.525	W.R.S.C
Thursday	09:00	7.096	Ex Post Office Techs
	19:30	3.690	QRP ZL2BH
	20:00	3.540	CW Practice Net
	20:00	3.615	Bch 89. REG Net
	20:30	3.696	ZL10A
	20:30	3.666	LF Net ZL2CA
	20:00	3.690	ZL QRP SSB Net
Friday	20:30	3.850	SPAM (AM Mode)
	20:30	3.650	W.S.R.C.
	20:30	3.560	Digital Modes Net
Saturday	10:30	28.530	10-10 Down Under
	19:30	3.650	Christian Fellowship
	20:00	3.760	???
	20:30	3.600	Ch 62. Reefton/Buller
Daily or Other	07:30	3.696	ZL20A
	08:30	3.730	ZL3RP
	15:00	14.300	Pacific Seafarers
	17:30	3.760	Home Brew
	05:00 Zulu	14.183	ANZA DX Net
	18:00	7.115	VK7OB
	19:30	3.720	ZL1MO
	18:30	3.766	ZL3LE
	08:30/20:00	3.730	ZL3RP
	20:30	3.725	ZL2HN / ZL4RF
	21:00	3.677	Counties Net ZL2MA
	21:00	3.535	New Zealand Net (CW)

This is designed to be a living list, Please update whenever you are able:

**Papakura Radio Club Inc.**  
**Branch 65 NZART Club Directory 2017**  
**Wellington Park, 1 Great South Road.**  
**PO BOX 72-397 Papakura 2244**  
**PHONE 09 296 5244**

**Westpac 03-0399-0019896-00**

**Club website: <http://www.qsl.net/zl1vk> Club email: [zl1vk.club@gmail.com](mailto:zl1vk.club@gmail.com)**

President	ZL1NUX	Gavin Denby	021 459 192
Vice President	ZL1BNQ	Richard Gamble	021 729 270
Secretary	ZL1AOX	Ian Ashley	021 198 1810
Treasurer	ZL1MR	David Wilkins	021 185 7903
Committee	ZL1DK	David Karrasch	021 560 180
	ZL1IRC	Ian Clifford	021 082 48400
	ZL1RJS	Rob Stokes	021 307 005
	ZL1RIC	Ricky Hodge	027 533 8155
	ZL4MDE	Mike Enderby	021 529 895
AREC Section Leader	ZL1BNQ	Richard Gamble	021 729 270
CD Liaison	ZL1AOX	Ian Ashley	021 198 1810
Newsletter Editor	ZL1NUX	Gavin Denby	021 459 192
Hall Custodian	ZL1AOX	Ian Ashley	021 198 1810
Newsletter.	Contact:	zl1nux@outlook.com	

Our newsletter is published monthly and normally distributed just before the club meeting. Please forward articles etc to the editor Wednesday 1 week before the general meeting. Please notify any change of address. Including E-Mail Address to the secretary.

### **Meetings**

General Meetings are held at the Clubrooms on the 1st Wednesday of each month, starting at 7.30 pm. Look at your calendar and mark these nights. The speaker follows the General Meeting.

Project Evenings are on the 4th Wednesday of each month.

Committee Meetings are held on the 3rd Wednesday of each month at 7.30 pm unless advised.

Activity Nights are held on the 2nd Wednesday starting at 7.30 pm.

AREC Meetings are on the 5th Wednesday night, also starting at 7.30 pm

AGM: Held in November

**Subscription:** Full membership and newsletter \$25.00 Family Membership and newsletter \$40.00

Bank Account number: 03-0399-0019896-00 Working Bees As required.

Branch 65 21 Award: For contacts with ZL1VK (5 Points) and 8 Papakura Radio Club Members (2 Points each) after January 2011. Total 21 Points. Cost \$5-00. Certified list and \$5-00 to Secretary, Papakura Radio Club. Address above.

### **ZL1VK Club Nets**

146.625 MHz Sunday at 8.30 am. Controller ZL1NUX, Gavin Denby. If the repeater is not available, listen 146.475MHz simplex.

3.755 MHz Sunday at 9.15 am. Controller ZL1BNQ Richard Gamble. (Linked to 146.675 & 438.775)