Madison Section Newsletter

Vol. 22, No. 3 **Serving IEEE Members of South Central Wisconsin** **March 2019**

Link to this newsletter

Newsletters are archived online at IEEE-Madison Web Site.

Upcoming Meetings

Amateur Radio Digital Communication Mode FT8

Date/Time: Tuesday March 12th, 6pm - 7:30pm

Location: Engineering Hall Rm 2309, 1415 Engineering Drive, Madison WI

Meeting Info

Joint PES-IAS/LMAG Meeting: "Magnetic Levitation and Bearingless Motors"

Date/Time: Wednesday, March 13th 11:30 AM - 1:00 PM

Location: Engineering Hall Room: 1152, 1415 Engineering Drive, Madison WI

Meeting Info

March Section Meeting: "Thorium and the Waste Issue

Date/Time: Th ursday, March 21st, 11:30 AM - 1:00 PM

Location: Sequoya Public Library, Meeting Room B, 4340 Tokay Blvd, Madison WI

Meeting Info

Announcements

Volunteers Needed! See below for more information

It's time to Renew you IEEE Membership!

Past Meetings

Review of January Section/LMAG EMB Meeting

Dr James Lattis gave a great talk! See the review below

Review of January (cancelled) February 12th (rescheduled) ECN Meeting

This meeting was a re-watching of Dr Rossi's presentation on LENR

Upcoming Meetings

Joint LMAG and Student Chapter Event: Amateur Radio Digital Communication Mode FT8

Released less than two years ago, the FT8 digital communication mode has taken the ham radio community by storm. By the end of 2017, FT 8 accounted for over half of all logged amateur radio contacts in the world. FT8 allows multiple concurrent conversations in a small bandwidth, requires lower power, can be completed in about a minute, and there are new features enabling rare DX stations to log multiple contacts simultaneously, resulting in rates comparable to other modes. Particularly for HF (160m thru 10m) frequencies, the popularity of the mode is enhanced by the low signal/noise ratio requirement and that DX contacts can be made during the current low period in the sunspot cycle. A transceiver, sound card interface, computer, and free software are all that is needed for any ham to get started. An overview of the practical use of FT8, along with some insight into the mechanics of the mode will be discussed.

Speaker:

 **Dale Burmester, Manager - Economic Planning at American Transmission Company**

Biography:

Dale Burmester, KA9SWE, is an Amateur Extra licensed ham radio operator. He has logged 10,000 contacts over the past ten years. Mr. Burmester holds a BSEE from UW-Madison and is a registered Professional Engineer (WI), an IEEE member, and a Badger Amateur Radio Society (W9YT) alumnus.

Event info is here: https://meetings.vtools.ieee.org/m/194048

Joint PES-IAS/LMAG Meeting: "Magnetic Levitation and Bearingless Motors"

 We each interact with no fewer than a dozen different electric motors every day. These electromechanical devices have become fundamental to our existence, pumping the water we drink, generating the electricity we use, aiding in heating and cooling our homes, and even providing our means for transportation. Electric motors are estimated to consume 45% of global electric energy, making them the single biggest consumer of electric power and an important technology to target for efficiency improvements in an effort to decrease our global energy footprint. Typically the first point of fa ilure in electric motors, and a source of significant energy loss, is the bearing system used to support the motor's shaft.

This talk will investigate using magnetic levitation to eliminate bearings from motor systems and create ultra-efficient, high speed, "bearingless" motors. This technology is specifically targeted towards overcoming obstacles in bearingless motor technology so that it can be used in large systems across the industrial and energy sectors where it has the potential to offer tremendous energy savings, size reductions, and intelligent, self-monitoring capabilities. A new type of motor winding technology, referred to as "dual purpose no voltage" windings, is proposed to overcome critical challenges that limit the efficiency and manufacturability of legacy bearingless motor systems. The proposed windings are able to re-use the electric motor's coils to create magnetic levitation forces on the shaft in addition to torque. The end result is a highly integrated, electromechanical device that is easy to manufacture and uses little raw material.

Bio:

Eric Severson received the B.Sc. and PhD degrees in electrical engineering from the University of Minnesota in 2008 and 2015, respectively. He worked as a post doctoral researcher at the University of Minnesota from 2015 to 2016. He then had a brief stint in industry as a principal electrical engineer at McMillan Electric Company. Dr. Severson joined the University of Wisconsin-Madison in August 2017 as an assistant professor. He is a fellow of the Grainger Institute for Engineering and associate director of the internationally recognized Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC). His research interests include bearingless electric machine design, power electronics, and flywheel energy storage.

Meeting info is here: &nb sp;https://meetings.vtools.ieee.org/m/192216

March Section Meeting: "Thorium and the Waste Issue"

 Dr. Steeves will review fission, actinides, fission products, and a comparison of thorium with uranium, especially with regard to thorium's use in molten salt reactors instead of light water reactors. His remarks are direc tly relevant to our concept of nuclear waste, which is so badly misunderstood by the media and most of the public

Bio:

Dr. Richard Steeves is an Emeritus Professor of Radiation Oncology at the University of Wisconsin School of Medicine with interest in reducing carbon dioxide emissions and the severity of future climate change. Since 2010 he has been leading a discussion group, called "Pathways to a Sustainable Planet", for the University's Participatory Learning and Teaching Organization. His experience in handling X-rays and radioactive isotopes, both in the USA and at the Curie Institute in Paris, prepared him for delving into the potential benefits of atomic energy for solving our impending climate crisis. Cleaning up our generation of electricity is a good way to start, for transportation as well as for home and industrial use. Richard drives an electric car and flies an electric airplane. He would muc h rather plug into a grid like Illinois' than Wisconsin's, and he believes we will need more than renewable energies to accomplish this.

Meeting info is here: https://meetings.vtools.ieee.org/m/191489

News

Volunteers Needed: Are you interested in volunteering? If so, IEEE Madison is looking for a few people interested in a few exciting new volunteer positions.

First, the Executive Committee is looking to fill a new position of auditor. This position will work with the Treasurer and the Executive Committee to review all expenditures and ensure that IEEE Madison remains compliant with all IEEE policies and procedures, as well as applicable laws. The auditor will also serve on the Finance and Audit committee. If you are interested and wondering how much time this volunteer position will require, it is estimated that it will be at most a couple hours per month. If you are interested, please contact Nathan Toth, IEEE Madison Section Chair, at tothnj@ieee.org.

Secondly, IEEE Madison will be forming an Ethics Committee. The purpose of the Ethics Committee will be to foster awareness of ethical issues, promote ethical behavior among members of IEEE Madison, and advise the Executive Committee on IEEE Ethics policy and concerns. The Ethics Committee will consist of 3 or more members of IEEE. For those interested in volunteering for the ethics committee, please contact Nathan Toth, IEEE Madison Section Chair, at tothnj@ieee.org. The time commitment for this committee will be approximately 2 hours per month.

Volunteerin g for IEEE Madison helps to grow a community of engineers, scientists, and technologists in the Madison area.If you are interested in any of the above positions or are interested in volunteering for any other position or task, please contact Nathan Toth at tothnj@ieee.org.

Renew your IEEE Membership: It is that time of year to renew your IEEE Membership and help support the Madison Section. A portion of your dues goes to financially support the Section, allowing us to host events with little or no cost to members. To renew your membership, click on this RENEW NOW link.

Reviews of Past Meetings

Review of January Section/LMAG EMB Meeting

Dr. James Lattis presented an interesting historical talk on the significant developmen t of electronic light measurement instrumentation and techniques for astronomical observations. Prior to electronic measurements, a system of comparative visual observation was used to rank the brightness of astronomical objects, particularly stars. Later, photographic emulsions were able to characterize object brightness, but measurement was tricky due to variations of emulsions and non-linear effects in exposure.

Enter the electronic age. In 1894, a selenium photocell was first used to measure astronomical light intensity, but sensitivity was limited. In about 1907, George Stebbins at the University of Illinois used a chilled selenium photocell and sensitive galvanometer to measure astronomical objects, with the first accurate measurements of the variation of light from the orbiting binary star system named Algol. With and estimated accuracy of 2%, this was much better than visual or photographic measurements.

After the discovery of the photoelectr ic effect, Professor Jacob Kunz at the University of Illinois was able to make tubes with a metal-hydride cathode and argon gas that achieved a modest ionic amplification. The result was an instrument that had better than 0.4% sensitivity, better noise performance, and very fast recovery time when coupled to a string electrometer for readout. Stebbins brought the Photoelectric Photometry (PEP) technology to the University fo Wisconsin in 1922 and continued to develop it here. The Kunz tube design was improved and coupled to GE electrometer tubes, immediately improving sensitivity by a factor of 4 or more. This Kunz tube/Whitford amplifier was the best scientific light detector available until after WW2. Washburn Observatory alone was producing good science with them and training other astronomers in PEP. Washburn continued the advance of PEP with the addition of the photomultiplier tube in 1936 and later added image intensifier tubes.

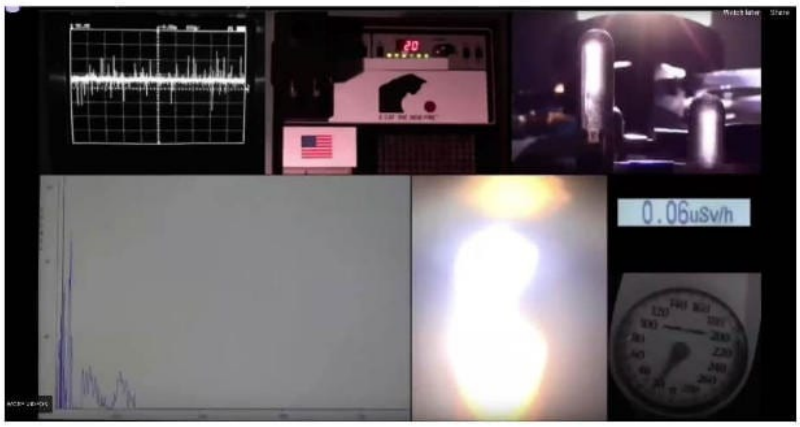
Dr. Lattis at UW Space Place Lecture

Early Kunz Tube and Later Photomultipliers

IEEE Member Jack Kisslinger shows Chuck Cowie a Tube. Jack worked at Washburn Labs

Review of January (cancelled) February 12th (rescheduled) ECN Meeting

The "Polar Vortex" hit causing the initial meeting cancellation. A rescheduled meeting at Sector67, held on February 12th reviewed the presentation and discussed the results. Though it looks like the device is ready for any HVAC technician to install, the general consensus among those attending wa s that they were not convinced Rossi had a real device. Most present wanted independent confirmation of the extraordinary results. The presentation is available at this link.



IEEE Madison Leadership

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- Section Vice Chair – Hugh Schmidt
- Section Treasurer – Tom Kaminski
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- PES/IAS Chair – Dan Ludois
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- EMB Chapter Chair – Dennis Bahr
- Life Member Affinity Group Chair – San Rotter
- Life Member Affinity Group Vice Chair – Charles Cowie
- ECN Chair – Tom Kaminski
- Young Professionals Chair – Nate Toth
- Members at Large: Clark Johnson, Craig Heilman, Dennis Bahr, San Rotter.

Membership Upgrades

Those interested in upgrading their IEEE membership level should send their resumes or other information showing five years of significant performance in an IEEE-designated field to Charles J Gervasi via email at cj(at)cgervasi.com. Madison Section Board will attempt to find Senior IEEE members knowledgeable in the applicant's area of practice who may be able to provide references. You are invited to attend thinformal networking portion of the monthly Section meetings (starting at 11:30am) to meet the Section Board members and discuss

intentions.

About IEEE

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