THE WAVE

The newsletter publication of the International Microwave Power Institute

June 2021

IMPI 55 Symposium is Three Weeks Away

The **55th Annual Microwave Power Symposium (IMPI 55)** will kick off on Monday, June 28th and run through Thursday, July 1st. At publication, there are over 60 attendees registered for the virtual event.

More than twenty-five presenters will take part in the four-day program, which includes a "*Solid State RF Energy Delivered*" short course, keynote speaker, invited papers, student competition, oral presentations, master class, panel discussions and three Poster and Exhibitor sessions. IMPI 55 officially begins with a Welcome Reception on Monday evening EDT and all sessions will be recorded and available to attendees. Electronic conference Proceedings are also included in the registration fee.

Registration is $150 for Corporate and Professional members and $75 for Student members. Additionally, IMPI Members may register as a virtual Exhibitor (includes one full conference registration) for $250 USD. There are nine exhibitors confirmed thus far: Cober, Crescend Technologies, WavePia, Odyssey Technical Solutions, PSC, Shandong Jaiwei Trading Company, QWED, Trumpf Huttinger and Microwave Techniques LLC.

The IMPI 56 Symposium has already been booked for June 14-16, 2022 at the DeSoto Hotel in Savannah, Georgia, USA.

IN THIS EDITION OF *THE WAVE*

PRESIDENT'S MESSAGE

This has been one hell of a year. When it became clear, in March 2020, that we were experiencing a pandemic, my wife and I self-quarantined for over a year, having food delivered, never entering a store, and avoiding all social contact. The latter was particularly difficult since, until this April, we were unable to see or hug our children and grandchildren. We were fully vaccinated in the second half of February, and we felt as if a tremendous weight and been lifted off our shoulders. And yet, I read reports about the skeptics, those who refuse to be vaccinated, which amounts to approximately one quarter of our population. There is a significant political divide among those who can't wait to be vaccinated, and those who refuse. The non-vaccinated refuse for such reasons as: they don't trust the government (7.1% of the eligible population); they do not trust the Covid 19 vaccines (8%); and those who refuse vaccines in general (3.4% of eligible adults). In addition to these reasons, there is also a skepticism about science in general; for example, think of the population that refuses to accept the concept that climate change is being caused by humans. Or, that approximately one third of a population rejects the concept of evolution by natural selection (By the way, evolution–denial has been a litmus test for conservative politicians, even up to the highest levels of the government). I could go on with other examples, but these are enough to upset any scientist, as well as members of the general public who hope for herd-immunity as a general protection for the population.

As one who was born before the second world war, when there was no television, and Dick Tracy's wrist phone was a fantasy, I am staggered on the daily basis by incredible advances made in many fields of science and technology. As Michael Shermer stated in eSkeptic (2/14/14) "Science and technology have changed our world more in the past century than it changed in the previous hundred centuries—it took 10,000 years to get from the cart to the airplane, but only 66 years to get from powered flight to a lunar landing. … Some computer scientists (suggest) that as early as 2030 we may encounter the Singularity—the point at which total computational power will rise to levels that are so far beyond anything that we can imagine that they will appear near infinite and thus, relatively speaking, be indistinguishable from omniscience" … I wonder what the position of the science skeptics will be at that time?

I find it so interesting that the same as science skeptics will watch television, use them mobile phones, drive their cars, store food in their refrigerator, use their microwave ovens, etc., without seeming to recognize that these are all products of science & technology; they wouldn't exist it weren't for the scientific and creative minds who invented, and then further developed them. The fact that the Covid 19 vaccines were developed in a period of months, whereas previously it would take years, is a testament to the tremendous advances that have occurred in molecular biology, genetics, the science of vaccine production, etc., and should not be the source of suspicion. I have to wonder of the people who are skeptical because the vaccine was developed so quickly, how much time would you like it to have taken? If it had taken years, and consequently many many hundreds of thousands more deaths, would that have made you more comfortable?

I realize that, to the inquiring mind, all of these rapid advances in so many fields are both wonderful and exciting. To this end, I'd like to present you with the three laws of Sir Arthur C. Clarke, the great science-fiction author and futurist; in previous newsletters I quoted his Third law, but I thought it would be fun to show you all three of them:

Clarke's First Law: "When a distinguished but elderly scientist states that it is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong."

Clarke's Second Law: "The only way of discovering the limits of the possible is to venture a little way past them into the impossible."

Clarke's Third Law: "Any sufficiently advanced technology is indistinguishable from magic."

Shermer's Last Law: Any sufficiently advanced Extra-Terrestrial Intelligence is indistinguishable from God. (note the "Singularity" quoted above.)

As I write this column, it is only two days until the Memorial Day Weekend, which is the honest official beginning of summer. Let's hope that we can all enjoy this summer as if it were pre-pandemic times.

All the best,

Bob Schiffmann, IMPI President

IMPI Annual Meeting Announced; Board Elections Voting Opened

The International Microwave Power Institute will hold our annual Business Meeting virtually on Thursday, July 8th from 10am-11am EDT. IMPI will highlight activities and membership, provide a financial update and elect new Board Members. All Members are encouraged to attend; an email with the Zoom link will be sent to all IMPI members on July 1st.

This year our Board of Governors election will be conducted electronically, from 8am EDT on Monday, June 7th through 8am EDT on Wednesday, July 7th. Voting Board Members serve a 3-year term. The list of current Board Members can be found here. This year, there are six (6) Voting Board seats up for election and the slate of nominees is as follows:

- Mr. Brian Blackwell, Odyssey Technical Solutions
- Dr. Graham Brodie, University of Melbourne
- Dr. Candice Ellison, NETL/Leidos
- Mr. John Mastela, EliteRF
- Mr. Bob Schiffmann, R.F. Schiffmann Associates Inc.
- Dr. Vadim Yakovlev, Worcester Polytechnic Institute

We will also accept additional nominations from "the floor" during the Annual Business Meeting. Please note, we do ask anyone who wishes to run for a Voting Board position first serve a minimum of one year as a Corresponding Board Member. Alternatively, there are various opportunities to get more involved with IMPI via working groups, committees, recruitment, programming, etc. Please contact Molly Poisant if interested in more details. All IMPI members in good standing are asked to **VOTE HERE** prior to 8am EDT on July 7th.

IMPI Solid State RF Energy Section

Microwave Markup Language Beta Release

The RF Tagging Initiative emerges from first stage development at IMPI's June 28, 2021 annual symposium, newly named in beta release Microwave Markup Language ("MML"). MML anticipates the widespread adoption of solid state microwave ovens, and their ability to cook and heat with heretofore unknown precision and accuracy. To that end, open source and open ended MML use a hypertext structure within which every conceivable microwave heating quality of a food product can be encoded. MML was created over the last year by a team of IMPI volunteers from industry, academia and the scientific community.

Short Course: Solid State RF Energy Delivered

June 28th from 10am-1:00pm EDT. $150 USD. See page three of the IMPI 55 program for more details.

Solid State RF Energy Section Annual Business Meeting

June 28, 2021 from 1:30pm-3:30pm EDT. Learn about the plans for the years ahead & participate in the election of officers.

Membership: is open to all IMPI members; there is no additional fee to join. Those interested in more details should contact alicia.standridge@impi.org

IMPI WELCOMES CORPORATE MEMBER: QWED

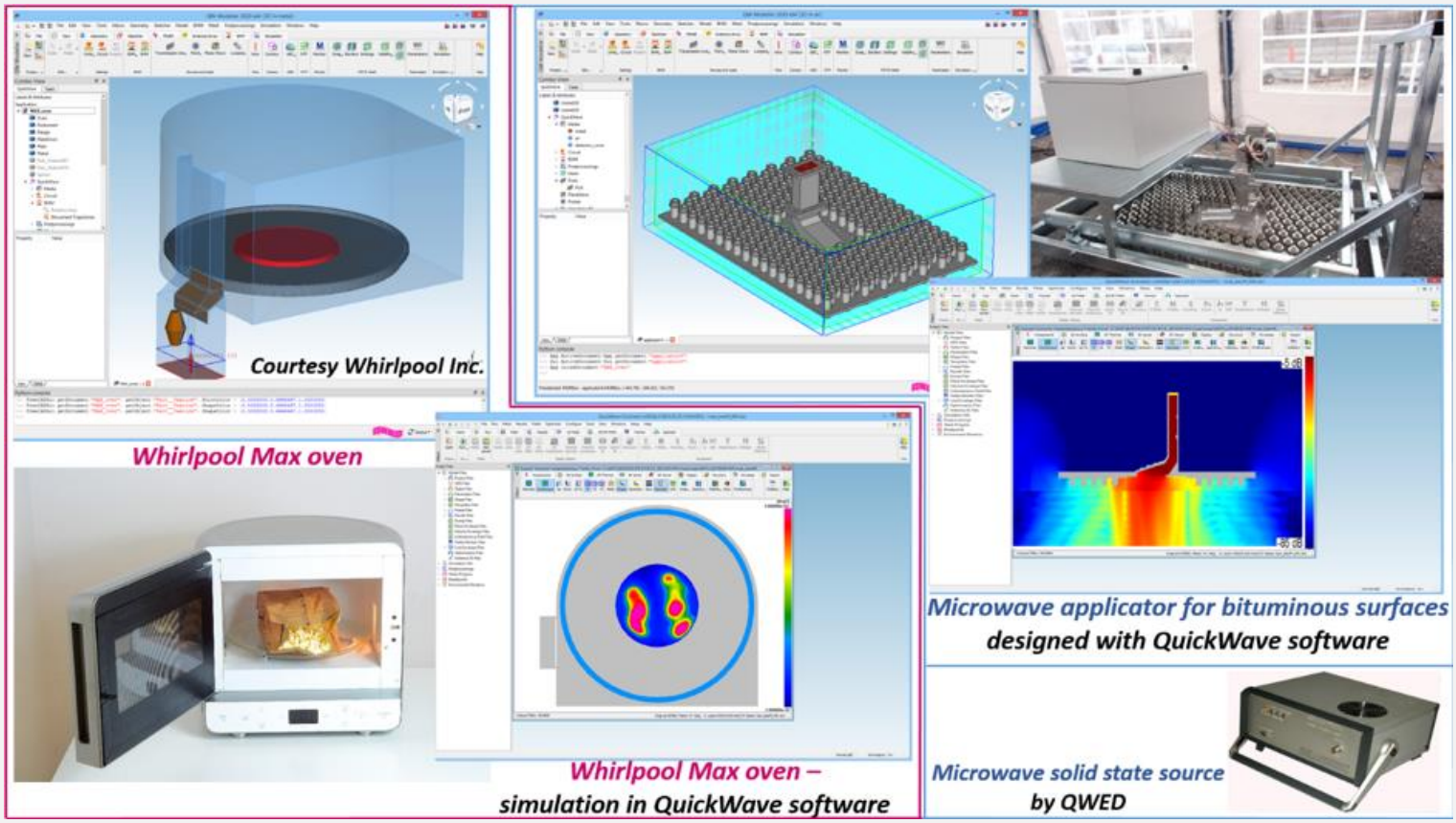
QWED Sp. z o.o. is a Polish SME founded in 1997 by 4 scientists/engineers from the Warsaw University of Technology. With decades of experience in microwave technology, mathematical physics, and computational techniques, QWED team of researchers, microwave engineers, and computer experts, for over 20 years now, is commercially developing software packages of QuickWave series, designated for electromagnetic (EM) and Multiphysics design and simulation. This general-purpose EM solver is enhanced with advanced modelling regimes dedicated to microwave heating phenomena, including industrially relevant capabilities such as modelling of microwave source operation (magnetron or solid state source).

With expertise in microwave technology and electromagnetic modelling, QWED is keen on offering its competences and be your partner in designing and modelling microwave power systems.

QWED offers also a wide experience in precise measurements of electromagnetic properties of materials at microwave frequencies. Years of research of QWED's experts, documented in worldwide-appreciated scientific and technical publications resulted in several types of dielectric resonators for precise measurements of electromagnetic properties of materials. The quality of the resonators has been recognised by industrial practitioners, leading researchers, and industrial standard creators.

QWED addresses also the needs of modern microwave power industry for controllable microwave power sources, allowing for enhancing efficiency of heating systems. With its team of experts, QWED designs and manufactures solid state sources of microwave power, gaining continuously growing interest among practitioners.

QWED will be happy to welcome any questions of IMPI members and discuss possible routs of collaboration (contact Dr. Marzena Olszewska-Placha, molszewska@qwed.eu).



CORPORATE MEMBER SPOTLIGHT:
LEANFA EVALUATION KITS FOR SOLID-STATE RF ENERGY APPLICATIONS

Solid-state microwave technology is born to solve complex problems, to which the old magnetron technology can hardly offer solutions. In particular, applications in the Industrial, Scientific and Medical (ISM) sectors require the generation of precise thermal profiles, while maintaining high process efficiencies and detailed parametric control through simple and flexible software interfaces.

LEANFA's solution is a modern combination of latest-generation solid-state generators and advanced software applications designed to make it easier to approach the most complex applications of the ISM world, such as heat treatment of food and food raw materials, minimally invasive surgery, generation of plasma and of particle beams, drying and sanitizing of materials, fabrication of technopolymers and production of nanomaterials.

To speed up the evaluation of our innovative technology, we have conceived two **Evaluation Kits**, ready for a true plug-and-play experience. A **STARTER** Evaluation Kit is available for a basic technology assessment with a single generator and a **PHASESHIFTER** Evaluation Kit is offered for advanced experimentation using two to four generators like in a phased array, by accurate frequency synchronization and 360° relative phase rotation. The two Evaluation Kits can be ordered with generators operating at 2450MHz or 915MHz, with a number of generators that best fits your needs.

Both Evaluation Kits are accompanied by our LeanOn advanced PC software platform for an absolutely user-friendly experience in learning the advantages of our solid-state generators in terms of parametric accuracy, real-time interaction with the processed material and extreme operating flexibility, featuring both CW and pulsed radiation modes.

With our evaluation kits you can test complex functionalities such as synchronized radiation modes and adaptive algorithms for process optimization. Microwave technology can be surprising if you rely on the right technological partner: we will take that complicated idea you have been thinking about for long time and make it achievable in a simple way!

Member are encouraged to submit articles for the Wave Newsletter. If you have an article you would like to share, please contact Molly.poisant@impi.org

Welcome to Our New Corporate Member

佳伟 JIAWEI

Shandong Jaiwei Trading Company

IMPI 2-Part Spring Webinar Series Recordings Available

If you missed the Spring Webinar Series, you can view recordings of Bob Schiffmann's presentation, "**Where Are They Now? Food Industry Opportunities in Microwave Processing**," and Juming Tang's presentation, "**Control of bacterial and viral pathogens in pre-packaged meals using microwaves: our experiences and future vision**" in the Member Only section of the IMPI website. We had excellent attendance at the webinars and are very thankful to Bob and Juming.

Many thanks to Conagra Brands for sponsoring the Spring Webinar Series, to Dr. Eric Brown of Conagra for serving as the technical host and to Dr. Sean McKeown of Graphic Packaging International for chairing the Webinars. If you have a topic or speaker to propose for the Fall, please email molly.poisant@impi.org

SAVE THE DATE: IMPI FALL 2021 SEMINAR

Reminder, IMPI's Fall 2021 Seminar will take place at the Protein Innovation Center outside of Chicago, IL from October 19-21, 2021. The event will be a hybrid (with limited in-person participation as well as a virtual attendance option). Corporate Member, Middleby Corporation, will sponsor this event. Stay tuned for program and registration updates. If you have a topic you would like explored or wish to serve on the program committee for this event, please contact molly.poisant@impi.org by June 15th. The program will be finalized and published in early August.

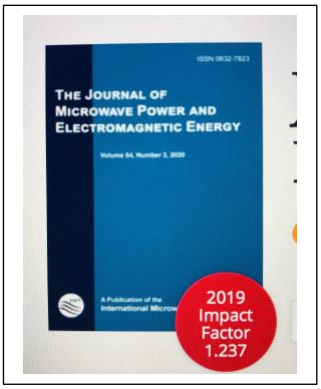
PARTNER EVENTS

The 18th International Conference on Microwave and High-Frequency Applications AMPERE 2021 will be held on September 13-16th, 2021, at Chalmers University of Technology, Göteborg, Sweden co-organized by RISE and Chalmers. More than 110 abstracts have been submitted and the review process has started. Several sponsors and exhibitors are already confirmed.

Important dates regarding the conference are found at: Important dates – AMPERE 2021 More information on the upcoming conference will follow.

On behalf of the AMPERE scientific committee and the organizing team, we would like to wish you most welcome to participate and looking forward to seeing you next September in Göteborg, Sweden.

JMPEE Volume 55, Issue 2 to be Released in Late June



Editor's message: Substance of non-communication applications in JMPEE.
Juan Aguilar.

Effect of microwave radiation on the magnetic properties of ludwigite and iron-boron separation.
Weijun Huang and Yajing Liu.

The use of microwaves in the process of obtaining nanopowders.
Livia Bandici, Geanina Banu, Anton Ficai, and Denisa Ficai.

Plasma cleaning under low pressures based on the domestic microwave oven.
Li Wu, Zhuang Liu, Wencong Zhang, and Xi Feng.

Microwave-heated high-silica glass cloth reinforced polyimide-based metamaterial absorber for aircraft deicing.
Zehai Zhang, Jun Zhang, Xiao Liu, Kun Zheng, Hongyi Yi, and Jianshu Wang

Numerical modeling of a high power triode based self-excited oscillator: a path forward more efficient designs and a better frequency stability of low cost high power RF sources.
Victor Guillot.

Please contact alicia.standridge@impi.org if you need assistance with your JMPEE access.

NEWS FROM AROUND THE WEB

Anglo American says it is trialling insitu microwave pre-conditioning at Amandelbult platinum mine

Microwave methane reforming for low carbon hydrogen

Wood-based Water Purification System Gets Boost From Microwave

Harvesting Energy From Radio Waves to Power Wearable Electronic Devices

Partnering to Help Reduce Microwave-Related Scald Injuries on Small Children

CALENDAR OF EVENTS

Stay up to date with IMPI Events by visiting our Calendar of Events page. If you have an event you would like to add to the Calendar, please contact molly.poisant@impi.org

The International Microwave Power Institute

PO Box 1140

Mechanicsville, VA 23111

info@impi.org www.impi.org

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