

E-NEWSLETTER

June 2019 issue

THE SOCIETY OF ACOUSTICS SINGAPORE

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Registration No:

0331/1989

Year of Registration: 1989

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sessions on:

- 1. Nonlinear acoustics and vibration**
- 2. Acoustic metamaterials & phononic crystals: fundamentals and applications**
- 3. Sound propagation in curvilinear spacetime**

Please visit www.icsv26.org for more informations.

II.ANNONCEMENTS

The Society of Acoustics will be sending out invoices to members with outstanding membership subscriptions. Members are encouraged to make payment in support of the Society.

The E-Newsletters will be made available to industrial

I. CONFERENCE NEWS

The 26th International Congress on Sound and Vibration (ICSV26) will be held in Montreal, Canada from 7 to 11 July 2019.

Woon Siong Gan will be organising three structured

available to all members who had made full payments of membership dues

The Society aims to increase membership by inviting all persons, including those from the institution of higher learning and other related societies such as the Institute of Architects, Singapore and the members of the mechanical engineering division of the Institution of Engineers, Singapore who are qualified in the various field of Acoustics to join our Society.

We are especially keen to invite students to join our society and we are establishing the Youth Chapter soon.

III. MEMBER'S NEW ADDRESS

Please note that Acoustical Laboratory Pte Ltd has moved to the following new address:

WE HAVE MOVED
TO OUR NEW OFFICE AT

will be made available to industrial contacts in an effort to promote the activities of the Society.

The Society is also exploring the possibility of organising talks and other professional events in collaboration with acoustic societies of other countries.

Membership
Certificates will soon be made

IV .MEMBERSHIP SUBSCRIPTION

Fellow	S\$70
Member	S\$50
Associate	S\$30
Student	S\$15
Corporate	S\$200

FEE BASED ON ANNUAL RATE

FOR MORE INFORMATION PLEASE
CONTACT: Dr. Woon Siong Gan at
email: wsgan5@gmail.com

Membership application forms can
be downloaded from the society
website:

www.acousticssingapore.com.

Please complete and email to
wsgan5@gmail.com

V. ARTICLE

The Singularity Phenomena in
Physics

Woon Siong Gan

Singularity is a very

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Singapore 247979.

**OUR CONTACT NUMBERS REMAIN
UNCHANGED.**

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remove the singularity giving rise to the awards of Nobel prizes. Black holes and phase transition are examples of singularity phenomena in physics. Singularity can be defined from various aspects based on different subjects of studies. From the natural sciences point of view, in a system theory, singularity in a dynamical system, means a small change can cause a large effects. In this sense, it is related to the chaos phenomena.

During phase transition there is the divergence or discontinuity of the derivative of the free energy with respect to some thermodynamic variables. Paul Ehrenfest classified phase

interesting phenomena in physics. Singularity means trend towards infinity or divergence. This occurs in the solution of equation where there is zero in denominator. Resonance is only one aspect of singularity. There is singularity problem in quantum electrodynamics and in Yang Mills theory giving rise to the renormalization methods to

solid/liquid/gas transitions are classified as first-order phase transitions because they involve a discontinuous change in density which is the inverse of the first derivative of the free energy with respect to pressure. Second-order phase transitions are continuous in the first derivative of the free energy with respect to the external field across the transition but exhibit divergence or discontinuity in a second derivative of the free energy.

Singularity is a very important behaviour in physics phenomena. Turbulence is a phase transition. In Kenneth Wilson's 1982 Nobel physics

transitions based on the behaviour of the thermodynamic free energy as a function of other thermodynamic variables. Under this scheme, phase transitions were labelled by the lowest derivative of the free energy that is discontinuous at the transition. First-order phase transitions exhibit a divergence or discontinuity in the first derivative of the free energy with respect to some thermodynamic variables. The various

Wilson's 1962 Nobel physics lecture [1], he mentioned that turbulence is a critical phenomenon and the critical point of turbulence is a phase transition. This can be further confirmed by the singularity behaviour of the scaling in turbulence and Kenneth Wilson [1] developed the renormalization group method to solve this singularity or divergence. Sonoluminescence is also a phase transition and there

is a singularity behaviour of the transport property of heat capacity shown by the tremendous generation of heat during cavitation leading to the sonoluminescence.

C N Yang and T D Lee [2] also studied the singularity in the second order phase transition of magnetization, the singularity behaviour of the partition function and the specific heat during phase transition.

Phase transition is a very big topic in physics, even the Big Bang and the origin of the universe can be considered as a

has been done only for classical metamaterials. It will be of great interest to study them for quantum metamaterials which have nonlinear properties of the transport properties of permittivity, permeability, and bulk modulus. For instance, the unit cell of the quantum metamaterial, the Josephson junction has nonlinear properties. It is known that negativity also occurs for quantum metamaterials. But here the singularity behaviour of the transport properties will have nonlinear properties and it is worth further studies. Nonlinear

phase transition. It has been pointed out by Woon Siong Gan[3] that metamaterial is an artificial phase transition

The studies of the singularity behaviour of the transport properties in metamaterials will enable a deeper understanding of metamaterials. There is a singularity behaviour of the transport properties of permittivity, permeability and bulk modulus at the point of phase transition where negative phase material occurs. So far the study of the singularity behaviour

behaviour will increase the sensitivity of the quantum metamaterials compared with classical metamaterials. Just a simple example of an error of 10 per cent in x will be manifested as an error of 1 per cent if a quadratic term in x is used as the square of 0.1 is 0.01. This shows that 1 per cent error can be detected instead of the 10 per cent for using the linear case

References

1. Wilson, K. The Renormalization Group and Critical Phenomena, Nobel Lecture Physics, (1982).
2. Lee, T.D., Yang, C.N. Statistical Theory of Equations of State and Phase Transitions. II. Lattice Gas and Ising Model, Phys.Rev 87(3),410-419,(1952).
3. Gan, W.S. Metamaterial is Artificial Phase Transition, Proceedings of Western Pacific Acoustics Conference, New Delhi, Nov (2018).

International Year of Sound 2020

Importance of Sound for Society and the World

www.sound2020.org

The board of the ICA is delighted to announce that the **International Year of Sound 2020** will be formally opened on Friday 31 January 2020 at the Grand Amphitheatre Sorbonne University, Paris.

Overview plan

The ICA and La Semaine du Son (LSDS) have

VI. ACOUSTICAL NEWS

The International Commission for Acoustics(ICA)has announced that 2020 to be the International Year of Sound (IYS 2020) and recommending activities around the world for this event. I strongly advise our society members to recommend what sort of activities they would like for the IYS 2020. They can email them to me to:

wsgan5@gmail.com

importance of sound in all aspects of life. The video will be

- An International student competition on the importance of sound.
- Organization of Special thematic sessions in major International Conferences to be held in 2020.
- Hosting of the website www.sound2020.org
- Promoting member activities
- Creating a record of the activities These activities will be financially covered by the ICA budget and by sponsorship.

ICA Member Activities

ICA Member organisations are encouraged to

The ICA and La Semaine du Son (LSDS) have signed a Memorandum of Understanding and will cooperate to achieve international recognition of the goals of UNESCO Resolution 39 C/49 25 September 2017 on “The Importance of Sound in Today’s World: Promoting Best Practices” in the framework of the **International Year of Sound 2020** (IYS 2020).

The IYS 2020 will comprise activities organised centrally by ICA, activities organized by La Semaine du Son and activities organized by the ICA Member Societies and International Affiliates. In this respect, the ICA is mobilizing its Member Societies and International Affiliates to arrange activities during 2020 that will promote best practices in sound.

ICA Central Activities

These will include at least:

- Official Opening on 31 January 2020.
- Production of a Video highlighting the

Founding Supporters

We are particularly grateful to our Founding Supporters (ASA, I-INCE, IIAV, EAA) who provided some seed funding which combined with ICA funding provided the necessary support to reach this stage.

Sponsorship

To reach our goal for the centrally funded activities sponsorship is required. Sponsors will receive extensive coverage from the website and from the centrally organised and nationally

ICA member organisations are encouraged to host activities that highlight the importance of sound in our world and will promote best practices in sound. These activities may include National Conferences on Acoustics, thematic conferences and workshops related to sound, seminars, concerts and special events addressed to the public, and involvement of the media. The details of the outreach activity will be posted on the IYS 2020 website. The logo for IYS 2020 can then be used in the promotion and a short report will be provided as a record of that event.

These activities will be financially covered by the Member's budget

La Semaine du Son Activities

LSdS hosts weeks of sound throughout France as well as Belgium, Argentina and is expanding to other countries such as Lebanon and Japan. During 2020 these will be recorded as contributions to meet the goals of the IYS 2020 as well as the UNESCO

Resolution 39 C/49. More information on LSdS from www.sound2020.org

organised activities.

Sponsorship prospectus is available from www.sound2020.org

ICA EVENTS at a glance

HOST WEBSITE www.sound2020.org

OPENING 31 JANUARY IN PARIS

VIDEO ON IMPORTANCE OF
SOUND

INTERNATIONAL STUDENT
COMPETITION

PROMOTE NATIONAL EVENTS

PROVIDE REPORT ON ALL
ACTIVITIES

ICA MEMBER ORGANISATIONS

PLAN YOUR IYS 2020 EVENT

OUTREACH TO HIGHLIGHT

IMPORTANCE OF SOUND AND
PROMOTE BEST PRACTICES

POST THE DETAILS OF EVENT ON
www.sound2020.org

RECEIVE THE IYS2020 LOGO

PLUS GOLD SPONSOR LOGO

HOLD THE EVENT

PROVIDE SHORT REPORT

The road map to the IYS 2020

2011 to 2019

It has taken considerable time to get this stage. In 2011 the ICA Board agreed to the concept of an International Year of Sound to be declared before the end of the decade. This was endorsed at the General Assembly in 2013. We spent some time following the same path as for the International Year of Light by seeking UNESCO and ultimately the UN approval. For various reasons that pathway became unachievable so in 2018 we established an agreement with the organisers of La Semaine du Son (LSdS) to work collaboratively to arrange an International Year of Sound in 2020. LSdS had been the primary force behind the UNESCO Resolution 39 C/49 25 September 2017 on “The Importance of

the primary force behind the UNESCO Resolution 37 C/47 25 September 2017 on "The Importance of Sound in Today's World: Promoting Best Practices". In 2019 and Memorandum of Agreement was signed between ICA and IAS. The IYS2020 becomes one of the outcomes of that resolution.

Importance of Sound for Society and the World

IYS 2020 Structure Initiated by:

Liaison Committee: overview and coordination of the IYS 2020. ICA Michael Taroudakis and Marion Burgess

LSDS Christian Hugonnet, Jean-Dominique

Polack and Nicolas Louis

Steering Committee:
Encourage and coordination of central and

regional activities Coordinators:
www.sound2020.org

Marion Burgess and Michael Taroudakis Regional responsibility:

Be seen Internationally

BECOME AN IYS2020 SPONSOR

GOLD SPONSORS
LOGO on all IYS2020 publicity

Other levels of Sponsorship available

PROSPECTUS FROM www.sound2020.org

Europe/Africa:

Society of Acoustics, Singapore, Newsletter June 014

Michael Vorländer, Antonino di Bella, Antonio
Perez-Lopez Asia/Pacific:

Jeong-Guon Ih, Kohei Yamamoto Americas:

Mike Stinson, Fausto Rodrigues, Julio Cordioli

National Coordinators:

Representatives from all ICA Member

Societies and International Affiliates will be responsible for the coordination and the reporting of the national activities and the activities of the International Affiliates. The Member Societies and International Affiliates are requested to appoint their representative by the end of September 2019. Name to be

sent to the ICA Secretary General,

[\(\[ICASecGen@icacommission.org\]\(mailto:ICASecGen@icacommission.org\)\)](mailto:ICASecGen@icacommission.org).

Also our society is in the process of setting up the regional Singapore Chapter of the Acoustical Society of America(ASA).

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VII. BID FOR FUTURE INTERNATIONAL CONFERENCES

The Society of Acoustics(Singapore) will be hosting the ICSV28 in Singapore from 25-29 July 2021 at the Marina Bay Sands Hotel.

Government Bodies

www.mom.gov.sg

www.nea.gov.sg

www.lta.gov.sg

Technical and Research Sites

Corporate Sites

www.metultrasound.com

www.noisecontrols.com

(The Society welcomes interested parties to contribute relevant websites to the above e useful links. For more information, please contact us. Thank you.)

Disclaimers

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President: Woon Siong Gan
E-Newsletter compiled by: Woon Siong Gan