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The Publication of the International EPR (ESR) Society

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Please feel free to contact us with items (news, notices, technical notes, and comments) or ideas for the *EPR newsletter*.

The *EPR newsletter* is published quarterly by the International EPR (ESR) Society and is available in electronic and printed form to all members of the Society. The deadlines for submission of news for upcoming issues: Spring March, 15; Summer June, 15; Fall September, 15; Winter December, 15.

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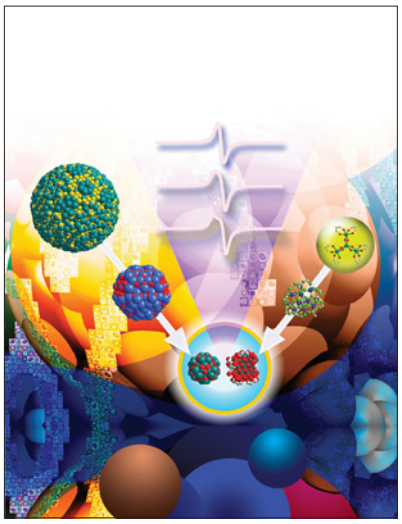

The cover picture illustrates aspects of the research carried out by Dante Gatteschi, recipient of the 2016 Zavoisky Award. It shows the transition from molecular nanomagnet to magnetic nanoparticles (D. Gatteschi, M. Fittipaldi, C, Sangregorio, L. Sorace: *Angew. Chem.* **51**, 4792 (2012))

epr newsletter

The Publication of the International EPR (ESR) Society

volume 26 number 4 2016

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Editorial

Dear colleagues,

Its amazing cover definitely shows that this issue is the last issue of 2016 and comes out on the eve of the New Year. What makes me think so?! Just look at the magnificent harmony of shape and color that resembles the most beautiful decorations of a Christmas or, as is common in Russia, New Year tree or the mysterious ornaments one observes in a kaleidoscope.

The content of the newsletter also unambiguously indicates that we say farewell to 2016. The report about the IES Annual General Meeting (pp. 3–5) summarizes the diverse activities of the IES in 2016. Conference reports about the 58th Rocky Mountain Conference in Magnetic Resonance: EPR Symposium (pp. 12, 13), International Asia-Pacific EPR/ESR Symposium 2016 (pp. 13, 14), and Xth EFEPR Conference (pp. 14, 15) keep you in touch with the vibrant life of the EPR community. Dante Gatteschi, Zavoisky Awardee 2015 and Fellow of the IES, meeting Michael Lerch, JEOL Awardee 2016, in the same issue (pp. 6–8) neatly testifies to our credo of keeping balance in featuring renowned and young magnetic resonance researchers. We are glad to congratulate Nicola Yordanov on his 80th birthday and to wish him many happy returns of the day. It would be good to keep the Anniversaries column running. Please do not be timid about contacting Aharon Blank with your proposals of appropriate candidates.

Of course, we cannot leave you without New Year presents for accurately paying your member dues (if you did not do that yet, please do it as soon as possible!). You understand, these presents are new issues of the *EPR newsletter*. In 2017, to name a few items, be ready to meet with Christoph Boehme, IES Silver Medal 2016 recipient, to enjoy the story about EPR in Italy assembled by Marina Brustolon and Dante Gatteschi and to congratulate the ESR Group of the Royal Chemistry Society with regards to its 50th annual international meeting.

The same as research, production of a newsletter is a team work. As Editor of the *EPR newsletter*, I am really a lucky one to enjoy collaboration with a team of terrific colleagues: CEOs of the IES; Associate Editors Candice Klug (Americas) (who also edits the New EPR Faculty column), Hitoshi Ohta (Asia-Pacific), and Sabine Van Doorslaer (Europe) (who also edits the Present Meets Present column), Keith Earle (Tips and Techniques column), Wolfgang Lubitz (Guest of the Issue column), John Pilbrow (EPR newsletter Anecdotes column), and Stefan Stoll (Software column); Sergey Akhmin, our technical editor, whose creativity is completely overwhelming; Evhen Polyhach, our highly responsible webmaster; and last but not least, Scott Morton of LaPlume Printing, our long-term reliable and extremely efficient printer.

Happy New Year to all of you and your dear ones! On behalf of the *EPR newsletter* team, best wishes for 2017 to you, our dear readers! I am not afraid to repeat myself, please feel free to contribute your news to our publication. Your inputs are always welcome!

Laila Mosina

ANNUAL GENERAL MEETING 2016

Minutes of the Annual General Meeting of the International EPR/ESR Society for 2016, held during the Xth EFPR conference on September 8, 2016, in Torino, Italy.

AGENDA

1. Introductory notes by Prof. Hitoshi Ohta
2. Brief Report of the Previous AGM – Snowbird, July 2015
3. President's Report, Awards 2016, Poster Awards 2016
4. Secretary's Report
5. Treasurer's Report (Financial Report 2015–16)
6. *EPR Newsletter* Editor's Report
7. Thanks
8. Other business

1. Introductory notes by Prof. Hitoshi Ohta

Dear Colleagues,

On behalf of the IES Executive Board I wish to welcome all participants to the 27th General Meeting of the IES at the Xth EFEPR Conferencee in Torino. I would like to express my gratitude to the conference organizers of this meeting, especially to Prof. Elio Giamello, Chair of EFEPR Conference, for allowing our General Meeting to take place during this Conference.

2. President's Report

2.1. Brief Report of the Previous AGM – Snowbird, July 2015, see *EPR newsletter* 25/3-4 (2015).

2.2. The importance of IES and its activities.

For basic science and applied research, EPR/ESR spectroscopy is continuing to become an increasingly important tool in a wide range of fields, from physics and chemistry to geology, biology, and medicine. The International EPR(ESR) Society will continue working to promote EPR and to foster scientific collaboration within the wide magnetic resonance community.

We'll be making a renewed effort to expand our membership. We believe that the IES has a lot more room to grow in terms of due-paying members. To achieve this, we need to increase the visibility and attractiveness of the Society. New functions to increase the visibility of the Society were discussed among the Executives.

One of the ideas was to have joint IES symposium with other related EPR/ESR conferences. Few examples are give:

APES-IES-SEST 2014, Nara, Nov 12–16, 2014 (Specially reduced registration fee for IES members, 279 participants, 22 countries)

EPR BioDose 2015 and the 2nd IES Symposium, Hanover, Oct 4–8, 2015

Xth EFEPR Conference, Torino, Sept 4–8, 2016 (Including IES session)

Attracting present and new members will be one of central focus of IES, and we welcome ideas from current members. We look forward to hearing from you and working together to help the Society to grow and flourish.

Recently our Website was upgraded!! (see Secretary's report)

We need to communicate and collaborate with scientists both inside and outside of the EPR field. The *EPR Newsletter* is intended to help mediate the exchange of information about excellent laboratories and scientific meetings (see Editor's report).

2.3. IES Awards for 2016

A major function of the IES is to honor distinguished contributors to EPR/ESR.

The awards were initiated in 1992 with the Gold Medal and extended to Silver Medals in various specialized areas of EPR, Young Investigator Awards and IES Fellowships.

Please visit www.ieprs.org for full details on IES constitution and by-laws relating to Awards.

IES awards for 2016 were: the following distinctions: Silver Medal for Physics/Materials, Young Investigator Award, IES Fellowships.

Poster Awards (11 (2014), 10 (2015) and 12 scheduled in 2016!). The Awards recipients are:

2016 Silver Medal for Physics/Materials: Christoph Boehme (USA), presented at the Rocky Mountain Conference 2016

2016 Young Investigator Award (IES): Sergei Veber (Russia) *

2016 John Weil Young Investigator Award: Claudia Tait (USA), presented at the Rocky Mountain Conference 2016

2016 IES Fellowships:

Charles Scholes (Germany) *

Arnold Raitsimring (USA)

Takeji Takui (Japan), presented at the 4th Awaji International Workshop on Electron Spin Science & Technology: Biological and Materials Science Oriented Applications (AWEST2016)

2015 IES Fellowships:

Edgar Groenen (Netherland) *

Sankaran Subramanian (USA) *

Brian Hoffman (USA), presented at Muelheim (Ruhr) 2016

" * " stands for the awardees present at the Xth EFEPR Conference, Torino.

IES Poster Awards

The IES sponsors Poster Awards for the best posters at select EPR-related meetings each year. Eligible candidates are graduate students and post docs (not later than 3 years after their PhD). The Award includes a certificate + US$200 award + 1 year membership of IES

IES Poster Awards for 2016 were given at the following meetings: The 49th Annual In-

ternational Meeting of the ESR Spectroscopy Group of the Royal Society of Chemistry, Apr 3–7, 2016, Colchester, UK (Europe); The 4th Awaji International Workshop on Electron Spin Science & Technology: Biological and Materials Science Oriented Applications (AWEST2016), Jun 19–21, 2016, Awaji Island, Japan (Asia-Pacific); Rocky Mountain Conference on Magnetic Resonance, July 17–21, 2016, Breckenridge, USA (Americas); APES 2016, Aug 28–Sept 2, 2016, Irkutsk, Russia (Asia-Pacific); Xth EFEPR Conference, Sept 4–8, 2016, Torino, Italy (Annual General Meeting of IES 2016, Europe); The 45th annual Southeast Magnetic Resonance Conference (SEMRC), Oct 14–16, 2016, Atlanta, USA (Americas).

We want to thank all the members of the Awards and Fellowship Committees for their excellent work for the Society.

Hitoshi Ohta

Call for IES Award Nominations 2017

Nominations are invited for: Gold Medal, Silver Medal Instrumentation, Young Investigator Award, Fellowship of the Society.

Nominations, accompanied by 100–150 words citation and curriculum vitae, are due by 1 November 2016. For more information, see our www.ieprs.org Award page

3. Secretary's Report: Aharon Blank

The Secretary is responsible for the day-to-day operations of the Society, and ensures efficient functioning of the Society, e.g.:

1. The Secretary shall maintain all the records of the Society shall keep the minutes of Society meetings, and be responsible for the distribution of all essential information to members.

2. Sending out invoices to the sponsors (in consultation with the Treasurer).

3. Informing members (and sponsors) of the various items of interest, e.g. announcements of conferences, workshops, publication of new issues of the *EPR newsletter*.

4. Organization of material for awards given by the IES: medals, certificates and citations.

5. Overlooking financial status and membership of the Society (in consultation with the Treasurer).

6. Website: The IES web site was upgraded! Better appearance, mobile devices compatibility, and better functionality.

7. Answering any enquiries.

8. Organizing AGM.

9. Liaisons with the President, Treasurer, Editor of the *EPR newsletter*, and the members of the IES Executive.

We want to thank Aharon Blank for his excellent work as Secretary of the Society.

Hitoshi Ohta

4. Treasurer's Report: Tatyana Smirnova (Financial Report 2015–16)

2015 Financial Report ($) (self-audited)	
Balance January 1, 2015	22,804.14
Deposits:	
Membership	4,358.86
Sponsors	18,186.50
Bruker contribution to printing	2,671.10
Contribution from APES-2014	5,780.83
Total Income	30,997.29
Expenses:	
Credit card fees, internet commerce and merchant services	681.71
Web design / maintenance & fees	1,077.12
Newsletter printing	7,005.00
Newsletter Editorial	3,242.00
State of Illinois+misc	155.19
Awards and medals	2,139.89
Total Expences	14,300.91
Balance December 31, 2015	39,500.52

2016 (January-June) Financial Report ($) (self-audited)	
Balance January 1, 2016	39,500.52
Deposits:	
Membership	3,780.21
Sponsors	3,192.00
Bruker contribution to printing	742.00
Total Income	7,714.21
Expenses:	
Credit card fees, internet commerce and merchant services	349.35
Web design / maintenance & fees	2,313.98
Newsletter printing	2,844.00
Incorporation fee	37.60
Awards and medals	1,602.02
Total Expences	7,146.95
Balance June 30, 2016	40,067.78

Presentation of the new web site and its features by the secretary.

Comments from the Treasurer:

We have balanced the budget in 2015!!!! Thank you, members and sponsors, for your support!

Thank you, sponsors:

Bruker BioSpin Corp
JEOL Resonance Inc
Active Spectrum
Oxford Instruments NanoScience
Virginia Diodes, Inc
Elva-1 Microwave Handelsbolag
Magnettech GmbH
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Cryogenic, Ltd
L & M EPR Supplies
Wilmad-LabGlass
Scientific Software Services
Research Specialties
Molecular Specialties
KEYCOM Corporation
Norell, Inc
GMW Associates

Status of membership as of July 1, 2016	
Membership: paid for 2012	225
Membership: paid for 2013	240
Membership: paid for 2014	273
Membership: paid for 2015	220
In 2015:	
Full members	144
Emeritus	16
Students	35
Postdoctoral members	19
Complementary/sponsored	46

Members represent 28 countries:
USA 75, Japan 43, Germany 20, Russia 22.

We want to thank Tatyana Smirnova for her excellent work as Treasurer of the Society.

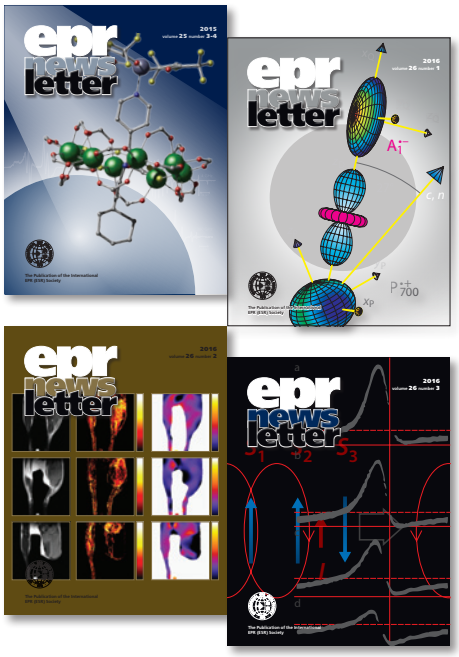
Hitoshi Ohta

5. *EPR newsletter* Editor's Report: Laila Mosina

Since the previous Annual Meeting of the IES in 2015 in Snowbird UT (USA), we published a double issue 25/3-4, a single issue 26/1, and prepared a single issue 26/2. The latter is displayed at this conference. We hope you had a look at 25/3-4 and 26/1 on the newsletter website and got relevant copies.

Now we start with the preparation of the forthcoming issue 26/3. To remind you, we present the columns of the newsletter:

Columns of the *EPR newsletter* 26/3 (2016)
Editorial
IES business
Awards
IES Young Investigator Award Revisited
Another Passion
Anniversaries
EPR newsletter Anecdotes
In Memoriam
Present meets future



Software
Tips and Techniques
Notices of Meetings
Conference Reports
New EPR Faculty
New Books and Journals
(including Hot Science)
Market Place
Reader's Corner
Guest of the Issue

Please feel free to submit YOUR material to all columns, dear colleagues!!!

On behalf of the Editorial Board, I thank most heartily all contributors to the *EPR newsletter* with special thanks going to the CEOs of the IES and editors of the columns in the *EPR newsletter*: John Pilbrow, Candice Klug, Wolfgang Lubitz, Keith Earle and David Budil, Stefan Stoll, Sabine Van Doorslaer, and also to Yevhen Polyhach, our web-master, and Sergei Akhmin, our Technical Editor. I gratefully acknowledge collaboration with Associate Editors Candice Klug, Hitoshi Ohta and Sabine Van Doorslaer.

6. Thanks

Special thanks go to ETH Zurich for hosting the newsletter website and the Zavoisky Physical-Technical Institute, Kazan for supporting the newsletter, and to:
All paid up members
Newsletter Editor: Laila Mosina
Technical Editor: Sergei Akhmin
Associate Editors:
Candice Klug, Hitoshi Ohta, and
Sabine Van Doorslaer

List of IES executives

International EPR(ESR) Society Executives:
President: Hitoshi Ohta
Vice President Americas: Stephen Hill
Vice President Europe: Graham Smith
Vice President Asia Pacific:
Elena Bagryanskaya
Secretary: Aharon Blank
Treasurer: Tatyana Smirnova
Immediate Past Presidents:
Lawrence Berliner and Klaus Möbius
Founder President: Harold Swartz

Attendance list

Dinar Abdullin
Katrin Ackermann
Mikhail Agrachev
Dmitry Azamat
Mykhailo Azarkh
Zuzana Barbierikova
Antonio Barbon
Thorsten Bchrenbery
Isabel Bejenke
Timur Biktagirov
Aharon Blank
Bela Bode
Alessio Bonucci
Alice Bowen
Frauke Breitgoff
Marina Brustolon
Duboc Carole
Enrico Cescon
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Vega Lloveras Monserrat
Petr Nevgebaver
Dipa Nimbalkar
Kevin Nys
Hitoshi Ohta
Olivier Ouari
Maria Cristina Paganini
Gabriele Panarelli
Piotr Pietrzyk
Andrey Pivtsov
Simon Pondaeven
Patrik Poprac
Albero Privitera
Mian Qi
Peter Rapta
Sara Della Monaca
Anton Savitsky
Max Schmallegger
Charles Scholes
Ludmila Simakova
Mantas Simenas
Zbigniew Sojka
Stefan Stoll
S. Subramanian
Claudia Tait
Mikhail Uvarov
Claudio Vallotto
Sabine Van Doorslaer
Sergey Veber
Christopher Wedge
Maxim Yulikov
Enrico Zurlo

Interview with Professor Dante Gatteschi on the Occasion of His Zavoisky Award 2015

EPR newsletter: *Dear Professor Gatteschi, on behalf of the readers of the EPR newsletter we congratulate you on your Zavoisky Award 2015. We are most appreciative that you agreed to answer the questions of this interview. Why did you start towards your career in science?*

I was attracted by the possibility of going deep into the properties of matter rationalizing the existing ones and making new ones taking advantage of the theoretical developments. At the time to decide for which discipline to orient, I was in serious doubts between Chemistry and Physics. Finally Chemistry took over, in part for the intrinsic possibility to make new molecules, and in part for the difficulty of Physics which scared me. At the end I made the compromise to stay half way between the two disciplines, with an interdisciplinary approach. I always enjoy when somebody asks me if I am a physicist.

Who introduced you into magnetic resonance?

Frankly speaking, I was essentially approaching Magnetic Resonance by myself. In the Laboratory of Coordination Chemistry of the University of Florence, directed by Luigi Sacconi,where I started, with a thesis in vibrational spectroscopy. It was the time when chemists started to work on systems which could be tackled by Ligand Field. The theory which demanded some time to become a familiar tool for chemists finally allowed to develop models for low symmetry compounds. The approach was exploited for electronic spectroscopy, magnetic properties and magnetic resonance.The first steps were made under the influence of Ivano Bertini who used EPR and paramagnetic NMR to characterize the synthesized compounds. We started to work with copper(II) because there was an interesting compound who seemed to break the Jahn Teller theorem. We started from zero developing the experimental and theoretical approaches and finally we showed that the Jahn Teller theorem was dynamic. After some continuing collaborations I stayed in EPR and Ivano became the reference point for NMR. My initial success in EPR took advantage of the collaboration with my student Alessandro Bencini who developed experiment and theoretical models. It was really sad that he passed away much too early.

What part of your research is most dear to your heart and why?

By and large the topics I developed in my research were structural magnetic correlations in low symmetry coordination compounds, expanding to one- and two-dimensional systems. But the most interesting family of compounds was the Single Molecule Magnet, SMM, which after being discovered by Lis in Wroclaw was characterized in detail in Florence. In short, the prototype was a cluster comprising 20 manganese ions. The magnetic characterization suggested a large spin ground state. The detail of the spin pattern of the compound showed a ground $S = 10$ which emerged from the high-frequency EPR spectra. The results were exciting but the most interesting part turned out to be the magnetic hysteresis of a molecule rather than the bulk magnetization. The possibility to use molecules for magnetic memories emerged immediately and there was a rush to make new SMM. The success in this area is shown by several new families of similar compounds which demanded a strong interdisciplinary approach. My interdisciplinary strategy, which I illustrated above, had been successful as shown by the more than 2000 citations of the first paper which introduced SMM .New names were invented, namely single molecule magnets, single chain magnets, single ion magnets. The role of EPR has been a fundamental one because it can send information directly from the molecules.

What is your message to the young generation of magnetic resonance researchers?

If we can forget for a while the horrors of the present time, we can enjoy the beauty of nature. It is a great privilege to investigate it and it should provide new opportunities. EPR is still in the growth phase and still many new opportunities open to the researchers. The interdisciplinary approach must be extended taking advantage of new properties. Many other breakthroughs can be expected.

The JEOL Prize 2016

Michael Lerch:

I am honored to have been awarded the JEOL Prize at the 49th annual international Royal Society of Chemistry EPR Meeting, and I would like to thank the organizers for the opportunity to share my research. The work I presented at the conference was conducted at UCLA under the mentorship of Professor Wayne Hubbell, in whose lab I currently work as a post-doctoral fellow. I am deeply grateful for his support and guidance throughout my time in his lab. During my time as a graduate student, my primary focus was the development of instrumentation and methods that enable EPR to be performed on spin-labeled proteins under high hydrostatic pressure. In my lecture I described one of these techniques, referred to as pressure-resolved DEER, as well as an early application in which mechanisms for the pressure response of proteins were investigated.

My research interests lie in defining the molecular mechanisms of protein function, particularly with respect to the functional role of protein conformational heterogeneity. The critical role of molecular flexibility for proper protein function is belied by the dominance of a single conformational state for many proteins under physiological conditions. Functionally relevant conformational states may have relative energies of only a few kilocalories per mole [1, 2], yet this results in equilibrium populations too low to be detected by most spectroscopic methods. One solution to this problem is to reversibly increase the population of these low-lying excited states with hydrostatic pressure [3, 4]. Pressure drives a reduction in the total volume of a system, which for proteins is typically attributed to elimination of buried packing defects or cavities [5]. One mechanism for the elimination of packing defects is water penetration into the protein interior, which is accompanied by local and eventually global unfolding at sufficient pressures [6]. Thus, the conformational space explored by pressure includes excited states with increased hydration compared with the ground state.

As a graduate student, I developed instrumentation and methods that enable site-directed spin labeling EPR spectroscopy on proteins at high hydrostatic pressure. Early applications of these techniques demonstrated their ability to identify compressible (flexible) regions of a protein, populate and characterize excited conformational states of a protein un-detected at atmospheric pressure, and reveal structural heterogeneity within the conformational ensemble [7]. One important advance in this area was the development of pressure-resolved DEER to probe structural heterogeneity in protein conformational ensembles and to determine distance constraints on the global structure of pressure-populated states. DEER provides distance distributions in the range of ~20–80 Å with angstrom-level resolution [8] and is thus ideally suited to resolve the individual conformations that comprise the high-pressure conformational ensemble. DEER data for spin-labeled proteins are typically collected at cryogenic temperatures, therefore a methodology was developed in which spin-labeled proteins are rapidly frozen under pressure to kinetically trap the high-pressure conformational ensemble for subsequent DEER data acquisition [9].

After briefly introducing this methodology, I described an early application in which mechanisms for elimination of cavities under high pressure were investigated in the cavity-enlarging Leu99 to Ala mutant of T4 lysozyme and derivatives thereof. In the L99A mutant, the ground state is in equilibrium with an excited state that is ~3% of the population under ambient conditions. In the excited state, the L99A cavity is filled *via* a structural rearrangement of helix F that places the Phe114 side chain in the cavity [10]. A combination of pressure-resolved DEER, high-pressure circular dichroism, and variable-pressure CW EPR revealed that the ground state remained the dominant conformation in the L99A mutant up to 3 kbar, with hydration of the cavity apparently occurring in the 2–3 kbar range. However, in the presence of additional mutations that lower the energy of the excited state, pressurization reversibly shifts the equilibrium towards the excited state. These results show that cavity elimination in response to pressure can occur either *via* cavity hydration or an alternative "structure relaxation" mechanism, wherein cavities are filled with protein side chains resulting from an increase in the population of an alternative packing arrangement of the protein core. This study provides the first direct evidence of a structure-relaxation mechanism in the response of a protein to pressure, revealing that pressure modulates an expanded con-

formational space that includes states with differences in internal packing, which may be accompanied by large structural rearrangements. Whether cavity hydration or structure relaxation is the dominant mechanism for the pressure response is determined by details of the energy landscape [11].

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The International Zavoisky Award 2016

Professor
Michael K. Bowman
(University of Alabama, Tuscaloosa, Ala. USA)

The 2016 Zavoisky Award is presented in recognition of a lifetime's work in magnetic resonance and, in particular, the laureate's contribution to the development of pulsed EPR and its application in radiation chemistry and molecular biophysics.

Professor
Arnold M. Raitsimring
(University of Arizona, Tuscon, AZ USA)

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For details, see the forthcoming issue of the *EPR newsletter*

From left to right: Vasil' Shaikhraziev, Deputy Prime-Minister of the Republic of Tatarstan, Arnold Raitsimring, Michael Bowman, and Kev Salikhov, Chairman of the Zavoisky Award Selection Committee. Taken by S. Kamaletdinov.

80th Birthday of Nicola Yordanov

We would like to offer special birthday wishes to Prof. Nicola Yordanov. This is a great opportunity to celebrate his contribution to the introduction and development of the method of Electron Magnetic Resonance (EPR and ENDOR) spectroscopy in Bulgaria. He is well known in the international scientific community with over 200 publications, a book and 4 patents in the field of chemistry. Nicola Yordanov was born on May 25, 1936 in the town of Kazanlak, Bulgaria. After finishing his three years duty in air forces, in 1965 he received a master's degree at the Faculty of Physics at Sofia University. In 1971 he received the PhD degree, in 1985, DrSci and since 1990 he is a professor.

In Bulgaria, the EPR was introduced in 1964 when the first homebuilt EPR spectrometer was constructed. The need of EPR and its further development in Bulgaria arose in 1962 and it was connected with biological problems. At that time, only two companies were producing EPR spectrometers – Varian (USA) and JEOL (Japan). Biologists were not going to purchase EPR spectrometer due to COCOM destrictions in that time. They took another way asking the Director of the Institute of Physics at the Bulgarian Academy of Sciences (BAS) about the possibility such spectrometer to be constructed in Bulgaria. After his positive answer there was an agreement with the biologists about the construction of two spectrometers. To realise this decision was charged electronic engineer Al. Malinovsky, who started to work on the problem with the help of physicist N. Yordanov. At that time the team had no knowledge about the theory, practice and construction features of EPR spectroscopy at all. So, they began all from "zero" level. After 2 years of work the first Bulgarian EPR spectrometer was ready in 1964. The availability of this EPR spectrometer and the beginning of EPR studies in Bulgaria was a remarkable event and it was noticed in the newspaper Evening News # 3884 of February 29, 1964. Both constructed in Bulgaria EPR spectrometers work in the S-band (3 GHz). In 1967, the Institute of Organic Chemistry purchased an EPR spectrometer (JES-3BS-X) by JEOL (Japan) and N. Yordanov was invited to organize the laboratory of EPR. In 1982, the JEOL spectrometer is replaced by the BRUKER spectrometer (model ER200 D SRC). In addition to two microwave bridges operating in the X- and Q-bands, it included an attachment for ENDOR (EN250) studies. In 1983, a part from Institute of Organic Chemistry removed and formed the Institute of Catalysis and the Laboratory of EPR is also included in the new institute. And so it is up to the present moment (2016). Prof. N. Yordanov is head of the Laboratory of EPR at the Institute of Catalysis until his retirement in 2009.

The general topic, EMR (EPR and ENDOR) study on the structure, properties and reactivity of transition metal complexes was started in 1964. The studies are performed in liquid and frozen solution state as well as in magnetically diluted powder or single crystal samples. The complexes of Cu(II), VO(II), Fe(III), Mn(II), Mn(VI), Ni(III), Pt(III), etc. were studied. In 1980 a self-redox reaction of sulphur containing copper(II) complexes was discovered. Following this reaction some sulphur containing copper complexes which in solution or in magnetically diluted state are in the form of copper(II) turn in magnetically condensed state or in solid state to copper(I). In 1984 was published the method of "ENDOR Crystallography of Disordered Systems" in its theoretically developed and experimentally confirmed form. This method gives the magnitudes of some weak and very weak undetectable by EPR electron-nuclear interactions known as a "Local ENDOR" transitions and also the polar co-ordinates (angles and distances) of the interacting nuclei within the g-co-ordinate systems. Simultaneously with the paper of Yordanov appeared a paper with theoretical considerations by B. Hoffmann and two years later another paper was published by Krelick. The first ^{31}P distant ENDOR was reported. In 1989 the method of "ENDOR Crystallography of Disordered Systems" was extended to the study of paramagnetic molecule-solute-solvent interactions, known before as a "matrix" ENDOR. Thus,

very fine electron-nuclear interactions were studied not accessible to any other instrumental method for structure investigation.

After 1990 in laboratory of EPR began develop new themes of applied research. The studies in this area are mainly on: 1990 – Tooth enamel dosimetry. The analysis of the EPR spectra of tooth enamel provides quantitative conclusions about the total absorbed dose of high-energy radiation. It may also be used as an emergency high-energy dosimeter. 1995 – Identification of high-energy irradiated foodstuffs. Irradiation of foodstuffs is a modern safe procedure for sterilisation. Identification of irradiated foods and development of new approaches for it is one of the goals of the laboratory in which they succeeded to develop new approaches for extending the identification period of irradiated plants and spices. 1995 – Solid state EPR dosimetry. This is a special area of application of EPR based on the analysis of the EPR spectrum of radiation-induced defects in the solid state, for example in alanine which may be used as a secondary and/or transfer dosimeter for high-energy dosimetric control. Prof. Yordanov and colleagues have developed new generation of self-calibrated alanine/EPR dosimeters. The two International Trials carried out with independent estimations in 13 laboratories in Europe shows a deviation in the obtained results in the frame of c.a. 3%. On these topics the lab is working up to date.

In 1991 Prof. Yordanov established the Bulgarian EPR Society immediately after the First European EPR meeting held in Padova. Main organizational activity of the Bulgarian EPR Society is an international symposium on "Electronic Magnetic Resonance of Disordered Systems" (EMARDIS) every two years since 1989. From 1967 Prof. Yordanov has organized a course at the Faculty of Chemistry-Sofia University "St. Kl. Ohridski" on "Theory and Practice of EPR Spectroscopy". An expression of his pedagogical activity is numerous successfully defended master and PhD students found a place within the scientific community both in our country and abroad. He was a visiting researcher at the University of Leicester (England), University of Florence (Italy), Phillipps University of Marburg (Germany) and many times visiting professor at universities in Germany, Japan, Libya, Austria etc. Prof. Yordanov has many awards and medals.

From 2009 Prof. N. Yordanov is retired and since 2010 is an associate member of the institute. He continued to work with us and give advice on research problems. If you ask us, his colleagues, what person is behind the series of facts and events that've listed here, what is makes him different and unique in our eyes, we responded in such way. One of the characteristic features of Nicola Yordanov is a strong character, energy, strong-willed and sequence in the pursuit of goals and bringing them to a successful conclusion. Another feature is a talent of contact with the audience, the ability to teach complex scientific material in an understandable way and to attract the attention of audience.

Professor Yordanov, we wish you to keep your vitality, energy and joy of life for many years!

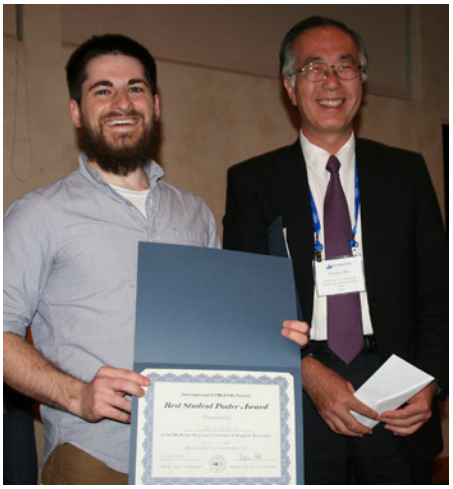
Katerina Aleksieva, Yordanka Karakirova and Ralitsa Mladenova, colleagues of the EPR group at the Institute of Catalysis.

The 58th Rocky Mountain Conference in Magnetic Resonance: EPR Symposium
July 17–21, 2016, Breckenridge, CO USA

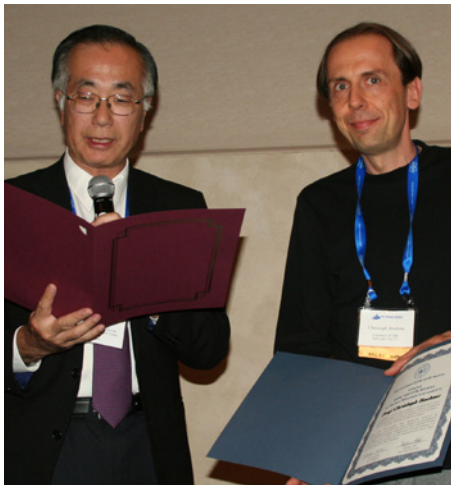
The 58th Rocky Mountain Conference in Magnetic Resonance was held this July in Breckenridge, CO at the Beaver Run Conference Centre (alt. 9700 ft). The meeting provided an opportunity for the attendees to poke their head above clouds and glimpse what exciting future developments lay in store for EPR methods and applications, whilst enjoying the beautiful surroundings and fresh (albeit thin) air.

The symposium limbered up with a Sunday workshop entitled "Get Into Shape", consisting of a series of excellent tutorials on the theory and practical application of shaped pulses in EPR, delivered by Gareth Eaton, Song-I Han, and Ralph Weber. This was very well attended, reflecting the rapidly growing interest in this new family of techniques in pulsed EPR. Later on in the evening, at the Bruker User Meeting and Reception, we were updated on the latest developments at Bruker including the new Rapid Scan system. During the four days which followed, we were treated to a dizzying array of presentations across seven sessions: Spin Devices (chaired by Ania Bleszynski-Jayich); Spin Centres in Biology and Chemistry (Fraser MacMillan); Materials (Christoph Boehme); Biological Macromolecules (Stefan Stoll); Methods (Susumu Takahashi); EPR Imaging (Howard Halpern); and finally, a joint session run with the parallel NMR symposium entitled Integrated Magnetic Resonance. Across all these sessions there was a strong emergent theme of new methodology – indeed this was less by design from the programme committee, and more a reflection of the rich and varied developments in EPR techniques currently taking place in the field.

The symposium would not have been possible without the generous support of our sponsors: Bruker Biospin and the National High Magnetic Field Laboratory (NHMFL) as well as Avanti Polar Liquid and Doty Scientific. We also thank Oxford Instruments for sponsoring the poster sessions, which had over 60 posters attracting lively discussions well into the evening. IES and Springer generously supported the awards for best student posters, as judged by a panel chaired by John McCracken, the conference co-chair. IES Poster awards were presented to: Ellen C Hayes (University of Washington) for Radical intermediates in the formation and repair of spore photoproduct, and Duane J McCrory (Pennsylvania State University) for Frequency swept rapid scan EDMR. A Conference Chair poster award was made to Melanie Drake (UC Berkeley) for Towards understanding the orientation dependence of NV-mediated bulk nuclear hyperpolarization in diamond at high magnetic fields. Springer Poster awards (accompanied by a free book of the winner's choice), were awarded to Katherina Bader (University of Stuttgart) for Chemical influences on quantum coherence in potential molecular qubits, Jessica Clayton (UCSB) for Distance measurements in Gd3+-labelled proteorhodopsin oligomers by 240 GHz CW EPR, and Andrew Stewart (University of Manchester) for Mapping the conformational landscape of calmodulin with PELDOR spectroscopy. Finally, IES Prize lectures were delivered at the symposium by Christoph Boehme (IES Silver Award recipient), on Pulsed electrically detected magnetic resonance, and by Claudia Tait (John Weil Young Investigator Award recipient), on Coherent pump pulses in DEER spectroscopy.



Ellen Hayes receives an IES Poster award (in absentia).


Christoph Boehme receives the IES Silver Award from Hitoshi Ohta (IES President).


Chairs of the EPR and NMR symposia thank Eiichi Fukushima (center) for an excellent talk at the Conference Banquet.

In this year's meeting, the traditional conference banquet became a more central part of the programme, incorporating the award ceremonies for the IES Prizes and conference poster awards, as well as an after dinner speech. In this regard, our speaker, Eiichi Fukushima, set a high bar for future speakers, with an excellent and entertaining talk on NMR in its formative years. We listened to the stories of this early magnetic resonance work, marvelling at how the early pioneers were able to achieve what they did using tools which we, looking through the prism of 60 years of development, might classify as primitive. From NMR based on magnetic field sweeps to signal averaging using long-exposure film aimed at dimmed oscilloscopes it is clear much has changed in magnetic resonance,

IES Medal winners and poster awardees (starting third from left): Christoph Boehme, Katherina Bader, Andrew Stewart, Jessica Clayton, Melanie Drake and Claudia Tait; flanked by (left) Hitoshi Ohta, John Morton, and (right) John McCracken.

in many ways driven by the major advances in supporting technologies. In the spirit of stimulating discussion and debate, this led us to ponder what stories one of the many graduate students in the audience might be telling at a similar event, 60 years down the line, regarding the "antiquated" methods of today. For example, will Rapid Scan EPR simply replace Continuous Wave EPR? Will rectangular pulses become confined to history, in favour of shaped pulses? Will EPR be continue to be performed on large ensembles of spins, or instead exclusively at the single spin level, following techniques based on magnetic resonance force microscopy, scanning tunnelling microscope, or optical-defect based magnetometry which were presented at the meeting?

The 2017 EPR symposium will take place July 23–28 in Quebec City, Quebec, jointly with ISMAR. The EPR sessions will be organized by John McCracken from the Rocky Mountain Conference, working with Daniella Goldfarb and Gunnar Jeschke from the ISMAR organizing committee. In 2018, the EPR symposium will be back in the mountains, taking place July 22–26, 2018 in Snowbird, Utah.

John Morton
Chair, EPR Symposium, RMCMR 2016

International Conference Asia-Pacific EPR/ESR Symposium 2016 (APES'2016)

August 28 – September 2, 2016, Listvyanka, Irkutsk District, Lake Baikal

The Xth anniversary conference Asia-Pacific EPR/ESR Symposium 2016 (APES'2016) took place on August 28 – September 2, 2016. The conference was held in Congress-hotel "Mayak" at the shore of lake Baikal in Listvyanka (Irkutsk District, Russia).

Asia-Pacific EPR/ESR symposia are the official biennial conferences of Asia-Pacific EPR/ESR society. The APES'2016 symposium followed the series of previous ones held in 2014 (Nara, Japan), 2012 (Beijing, China), 2010 (Jeju, Korea), etc., tracing back to the first Asia-Pacific EPR/ESR Symposium in 1997 in Hong Kong. The current APES'2016 was the second conference of the Society held in Russia, whereas the former one was organized in Novosibirsk in 2006 by Profs. Elena Bagryanskaya and Sergei Dzuba.

The Asia-Pacific EPR/ESR Symposium 2016 was the scientific forum for discussions on modern trends and achievements in EPR spectroscopy, new technical developments and approaches, intriguing aspects of EPR applications to a variety of materials, biologically-relevant systems and chemical complexes or molecules. Different approaches based on continuous wave, time-resolved and pulsed EPR were successfully implemented. The objects of the studies included biological media, biomolecules and biopolymers, magnetoactive materials, including molecular magnets, short-lived radicals, stable nitroxide, trityl and other

Conference photo

radicals. Judging by the breadth of the addressed EPR topics, the conference is unique in the Asia-Pacific region.

The conference serves scientists working in fields of EPR, spin chemistry, theoretical chemistry, spin dynamics, magnetic materials, biological systems. 130 scientists from 15 countries including Russia, Australia, China, India, Japan, Korea, Phillipines, USA, Israel, Belarus, Germany, Poland, France, Switzerland, United Kingdom participated in the APES'2016. The conference included 9 plenary lectures, 17 invited and 42 oral talks, 42 poster presentations. The plenary lectures were given by the world-known experts in the field: Prof. Hitoshi Ohta (Kobe University, Kobe, Japan), Prof. Sergei Dzuba (Institute of Chemical Kinetics and Combustion, Novosibirsk, Russia), Prof. Jiangfeng Du (University of Science and Technology of China, Hefei, China), Prof. Subray Bhat (Indian Institute of Science, Banglore, India), Prof. Steve Bottle (Queensland University of Technology, Brisbane, Australia), Prof. Daniela Goldfarb (Weizmann Institute of Science, Rehovot, Israel), Prof. Gunnar Jeschke (ETH, Zürich, Switzerland), Prof. Valery Khramtsov (West Virginia University, Morgantown, USA), Prof. Graham Smith (University of St. Andrews, Scotland, United Kingdom).

From left to right: Alena Sheveleva, Hitoshi Ohta, Elena Bagryanskaya and Hirona Takahashi.

Lot of young scientists took part in the APES'2016, and several of them received the awards of International EPR(ESR) society and Asia-Pacific EPR/ESR Society, nominated for the best poster or best oral presentations. The awardees included talented researchers from Japan, China, Germany, Russia. Among them are Thilo Hetzke (Goethe University Frankfurt), Fazhan Shi (University of Science and Technology of China, Hefei, China), Mr. Andrey Kuzhelev (NIOCh SB RAS and NSU), Dr. Alena Sheveleva (ITC SB RAS and NSU).

General meeting of Asia-Pacific EPR/ESR society was held during the conference. This meeting addressed the question of the venues of the future conferences, election of new president of the Society and update of the Society Council members. Prof. Elena Bagryanskaya was elected as the new president, whereas the next conference is to be organized by Prof. Steve Bottle in Australia (2018) and the consecutive one by Prof. Ramakrishna Damle in India (2020).

Last but not least, the weather was fantastic during the most of the conference, and the social program included the sightseeing of Irkutsk District, Listvyanka village, architectural and ethnographic museum Talzy, boat trip on the lake Baikal. Overall, there is no doubts that the Asia-Pacific EPR/ESR Symposium 2016 served well to making new scientific contacts in the field of EPR, exchange of experiences between spectroscopists from different countries and different areas of EPR applications, and altogether to the development of EPR in Asia-Pacific region and worldwide.

Elena Bagryanskaya, Chair APES'2016
Matvey Fedin, Co-Chair APES'2016

Xth EFEPR Conference
September 4–8, 2016, Toronto, Italy

The Xth Conference of the European Federation of EPR groups (EFEPR) took place on September 4–8, 2016 in Torino (Italy) with around 170 attendees from 24 different countries including some delegates from North America, South America and Asia. This is the result of the fruitful cooperation with the International EPR society (IES) that is here gratefully acknowledged.

7 plenary lectures, 9 key note lectures and 21 oral contributions were held during the Conference and 116 posters displayed throughout. A wide range of applications, method development and theory were covered, setting the stage for a stimulating interdisciplinary dialogue among physicists, chemists, biochemists and material scientists.

During the Conference the Ulderico Segre prize and the prizes of the IES society were delivered. The Segre prize, sponsored by the Italian EPR Group (GIRSE) for an outstanding doctoral thesis in the field of magnetic resonance was awarded *ex aequo* to Dr Claudia E. Tait and Dr. George Cutsail.

The conference included the activities of the International EPR(ESR) Society with a specially allocated session. The IES sponsored two student awards for the best posters presented at the Conference, which were awarded to Mykhailo Azarkh (University of Kostanz) and Petr Neugebauer (University of Stuttgart). The IES fellowships for 2015 and 2016 were conferred to Sankaran Subramanian (2015), Edgar Groenen (2015) and Charles Scholes (2016). The IES Young Investigator award was presented to Sergei Veber(Novosibirsk).

The Conference was also the occasion for discussing the future of the EFEPR Society,

during the General Assembly, held on Tuesday September 6. During the Assembly the structure and future of EFEPR was discussed leading to a new organizational set-up, with a President and two Vice-Presidents all coming from different EU countries. Sabine Van Doorslaer (University of Antwerp, Belgium) was elected as the new President of EFEPR and Donatella Carbonera (University of Padova, Italy) and Carole Duboc (University of Grenoble, France) are the two Vice-Presidents.

Thanks are due to our sponsors and exhibitors (Bruker, Magnettech, Adani, IREN, L'Oreal, Camera di Commercio di Torino), the University of Torino, the Scientific and Local Organizing.

International Advisory Board: Donatella Carbonera, Georg Gescheidt, Elio Giamello (Conference Chairman), Etienne Goovaerts, Edgar Groenen, Bruno Guigliarelli, Wolfgang Lubitz, Eric McInnes. **Local Organizing Committee:** Mario Chiesa, Ivana Fenoglio, Elena Ghibaudi, Chiara Gionco, Enzo Laurenti, Stefano Livraghi, Maria Cristina Paganini. **Committees:** Thanks are also due to the speakers, the session chairmen, the poster presenters and to the team of blue-shirt conference helpers (PhD and Master students in Torino University). The active contribution of Tiziana Cannizzo and Frine Scaglione (SAFOOD) to organizing this conference is also gratefully acknowledged.

Elio Giamello
(Conference Chairman)

Market place

POSITIONS

Research Specialist Senior Position at West Virginia University

The Department of Biochemistry is searching for a Research Specialist Senior, with a strong background in RF/MW engineering experience. This position is available immediately and will be in the In Vivo EPR Multifunctional Magnetic Resonance center, Department of Biochemistry, Health Sciences Center, West Virginia University in Morgantown, WV. The selected candidate will assist Dr. Tseytlin in designing and manufacturing electron paramagnetic resonance (EPR) spectrometers and imagers. The position will be for one year in length, with a possibility of extension. The duties and responsibilities for this position are: designing, manufacturing, assembling, and experimental testing of EPR spectrometers and imagers. Applicants must hold a minimum of Master's Degree (or foreign equivalents) in Electrical Engineering, Physics or a related field and two years of experience, or a combination of education and experience. Qualifications must be met by time of appointment. All interested, qualified candidates should apply to jobs.wvu.edu with a cover letter of interest and current CV.

West Virginia University is an Equal Opportunity/Affirmative Action Employer and the recipient of an NSF ADVANCE award for gender equity. The University values diversity among its faculty, staff and students, and invites applications from all qualified individuals, including minorities, females, individuals with disabilities and veterans.

EQUIPMENT

Wanted: Badly needed certain parts of, or even a complete Bruker X-Band microwave unit from the mid-seventies, the one which came with the Bruker B-ER 420 system. Particularly, the klystron heating and protection board, B-E-Z 10. Please contact Prof. Dr. Wolfgang E. Trommer, Department of Chemistry, TU Kaiserslautern, P.O.Box 3049, D-67653 Kaiserslautern, Germany. E-mail: trommer@chemie.uni-kl.de.

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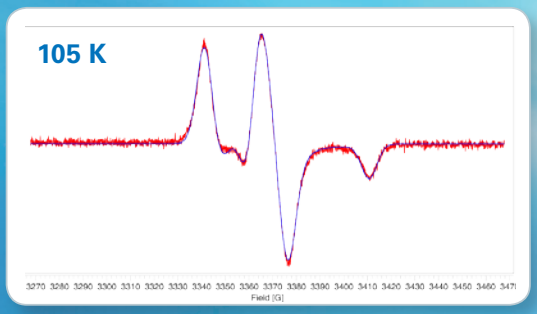
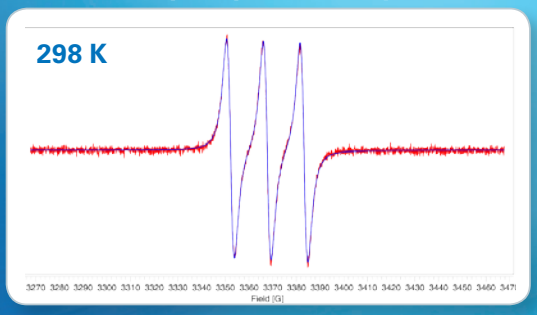
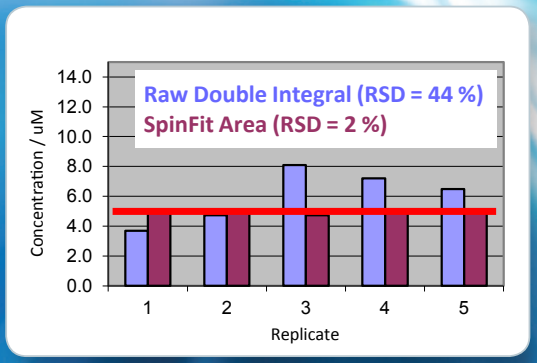


Tempo / Toluene @ 105 K
SpinCount = 1.36 mM

Isotropic SpinFit for liquids



Tempo / Toluene @ 298 K
SpinCount = 1.34 mM



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