epr newsletter

2010
volume 20 number 1

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*.

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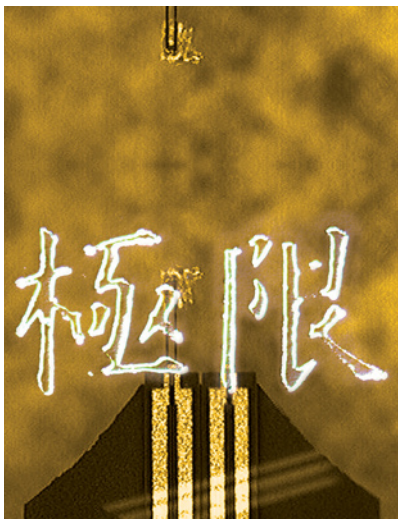

The cover picture illustrates some of the current research carried out by Hitoshi Ohta, recipient of the 2008 IES Silver Medal for Instrumentation. It shows a microcantilever used in mechanically detected high-frequency ESR measurement. A hieroglyph meaning "extreme" in Japanese is fabricated by a photolithography technique in his laboratory.

epr newsletter

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volume 20 number 1 2010

continued on page 2

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Editorial

Dear colleagues,

I like to look at the covers of the *EPR newsletter*. I like them. On the one hand, they vividly demonstrate the diversity of the EPR research distinguished by various magnetic resonance prizes and awards and the ingenuity and creativity of our honorable laureates. On the other hand, they are the manifestation of the fine feeling for beauty and harmony of our highly talented Technical Editor, Sergei Akhmin. All covers are special but some of them are more special than others. One of these is the cover of 18/1 showing a collage of impressions of Thomas Prisner, recipient of the 2007 IES Silver Medal for Physics/Materials Science, from MIT, the Charles River skyline and figures and calculations out of his notebook. Since 2004 I dreamed that one day Thomas would share with us the mysterious painter part of his personality. And believe it or not, sometimes dreams come true! Just read his article in the "Another Passion" column (p. 6)! Danke sehr, Thomas! In turn, I'll share with you his Christmas card that I received in December 2009. He and his family are easily recognizable, aren't they?!

I know you are anticipating the article of Erwin Hahn and Alex Pines that is devoted to Anatole Abragam's 95th birthday that was mentioned in my previous editorial. Yes, they did it. Have a look at the "Five Years After" column (p. 9)! I was greatly impressed by the depth of feelings and emotions expressed in this article. I really envy Erwin and Alex for their astounding ability to find such an amazing collection of words to express their feelings. I could not wait for Anatole to read it in the newsletter so I sent it to him immediately after receiving it in my email. Nina told me that "AA found the article very good". Another delight was to get an interview with Nicolaas Bloembergen on the occasion of his 90th birthday (see also 14/1-2, p. 20 for his previous interview and 15/1, p. 13 for an article on his 85th birthday). It is inspiring to have a positive response from one of our greats. Thanks and our best wishes to you, Professor Bloembergen!

In his current interview, Nicolaas Bloembergen said that he has found the current young generation of students of the sciences equally motivated as he was 70 years ago. We find the confirmation of his words in this issue of the newsletter: look in the intelligent faces of the young researchers, laureates of various awards: Takayuki Kumada, Norikazu Mizuochi, Hans Moons, and Mayumi Yamato and read their articles (pp. 4–5) in order to understand that EPR has a glorious future. It is also good to realize that our prominent scientists are properly acknowledged for their lifetime research in magnetic resonance: Naresh Dalal, the 2010 IES Silver Medal for Physics winner, Ron Mason, the 2010 Bruker Prize winner (see also 18/2-3, p. 9), Yuriy Molin, the 2009 Voevodsky Prize winner (see also 14/3, p. 11), Jim Norris, Fellow of the IES, Yuri D. Tsvetkov, Fellow of the IES (see also 13/3, p. 13), and Hans Wolfgang Spiess, the 2010 Zavoisky Award laureate (see also 17/2-3, p. 13). Our heartfelt congratulations to all of you!

Five years ago, Richard Ernst wrote an article for the *EPR newsletter* on 150 years of ETH Zürich (15/1, pp. 12–13). Unfortunately, I was unable to persuade him to give an ETH-related five-years-after interview. We do not necessarily get everything we want even if we strongly wish for it. However, in this issue we are privileged to be able to reproduce his article on follies of citation lists and academic ranking lists published in *Chimia* (p. 10). I am sure it will find an echo in the soul of every researcher. We are most appreciative that Richard Ernst continues his collaboration with the *EPR newsletter*.

The Zavoisky Physical-Technical Institute of Kazan celebrates its 65 years and its director, Kev Salikhov, presents a concise review of its achievements and prospects showing his enthusiasm which is indeed catching (p. 8). As an insider, I can say that the abundance of his ideas and projects and persistence in their implementation is advantageous to the institute, especially in the current complicated situation.

A success story about EPR in Slovenia told by our colleagues from the Institute Jožef Stefan, Ljubljana (pp. 12–14) nicely adds to the EPR mosaics featured in the "EPR newsletter Anecdotes" column of previous issues. One piece of a puzzle to another and, as a result, I hope we will get a complete picture of EPR in the world.

It is my pleasure to finish my editorial (is there anybody who is patient enough to read it to this sentence?) with thanks to our editorial team: Candice, Hitoshi, Thomas and Sergei, and also Shirley Fairhurst, John Pilbrow and Reef Morse. It is relaxing to know that I have your support, dear friends.

Laila Mosina

IES AWARDS

Fellow of the IES 2010

Professor **James Norris**
University of Chicago, USA

in recognition of his innovative contributions to the elucidation of the molecular structure of paramagnetic species in photosynthetic reaction centers.

Fellow of the IES 2010

Professor **Yuri Tsvetkov**
Institute of Chemical Kinetics and Combustion, Novosibirsk, Russia

in recognition of his long and distinguished career in EPR/ESR, & in particular for his ground-breaking work in electron spin echo (ESE) spectroscopy & pulse electron-electron double resonance (PELDOR).

The IES Silver Medal for Physics 2010

Professor **Naresh Dalal**
Dirac Professor of Chemistry & Biochemistry, Florida State University
Faculty Associate at the National High Magnetic Field Laboratory

in recognition of three decades of pioneering research in EPR & its novel application to a wide range of problems from studies of free radicals in coal and diesel soot, toxicology, and carcinogenesis to ferroelectric and magnetic phase transitions in quantum solids and high-temperature superconductivity.

Awards

The Voevodsky Prize 2009

The 2009 Voevodsky Award was awarded to academician Yuriy N. Molin, Institute of Chemical Kinetics and Combustion, Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia, in a ceremony marking his outstanding contribution to creation the basics of spin chemistry, development of new methods of studying kinetics and mechanisms of radical reactions based on the manifestations of spin quantum coherency.

The Voevodsky Award was presented on February 12, 2010 in Akademgorodok, Novosibirsk at the meeting of the Scientific Council of the Institute of Chemical Kinetics and Combustion.

Vladislav V. Voevodsky was an outstanding physical chemist, one of those who stimulated the development of chemistry in Siberia, one of the founders of this Institute, and the Dean of the Faculty of Natural Sciences and founder of the Department of Molecular Physics of the Novosibirsk State University. He created the recognized Soviet scientific school of EPR in chemistry and was the first to underline the role of weak interactions in chemical phenomena.

The prestigious Voevodsky Prize was established by the two institutes of the Siberian Branch of the Russian Academy of Sciences: Institute of Chemical Kinetics and Combustion and International Tomography Center. It is supported by the AMPERE Society, International Society for Magnetic Resonance, the International EPR Society, European Federation of ESR Groups, and the Novosibirsk State University. The current Prize Selection Committee consisted of Professors E. G. Bagryanskaya, V. A. Bagryanskii, S. A. Dzuba, I. V. Koptyug, P. A. Purtov, and the Chairman, academician R. Z. Sagdeev.

From left to right: Renad Sagdeev and Yuriy Molin

Previous winners of the Voevodsky Prize were: A. Buchachenko (1997), A. Hoff (1999), L. Blumenfeld (2001), L. Volodarsky ▶

(2002), K. Möbius (2006), Yu. Tsvetkov (2006), and G. Likhtenshtein (2007).

The Prize Ceremony was chaired by R. Z. Sagdeev. He, as the Chairman of the Prize Committee, announced the decision of the Voevodsky Prize Committee and presented the Voevodsky Prize Diploma to Yu. N. Molin, his mentor.

Yu. N. Molin gave his Voevodsky Prize lecture in which he told about his way in science and the role of Vladislav V. Voevodsky in his life.

The JEOL Student Talk Prize 2010

I am very grateful for receiving the JEOL medal at the 43rd Annual International Meeting of the Electron Spin Resonance Spectroscopy Group of the Royal Society of Chemistry at the Cardiff University. It is a great honor to receive a prize based on my scientific work and presentation skills. Despite the personal character of the prize, I cannot fail to thank my supervisors Sabine Van Doorslaer (Spectroscopy

The JEOL Student Talk Prize 2010 to Hans Moons.
From left to right: Peter Meadows, David Collison and Hans Moons.
For details, see this newsletter, p. 17

in Biophysics and Catalysis, University of Antwerp) and Etienne Goovaerts (Experimental Physics of Condensed Matter, University of Antwerp). I also want to thank all the other scientists, students, professors, ... with who I worked during my PhD and with who I had a lot of fun. I also want to thank my family and friends who support me all the way.

For the work I presented in this contest, I want to especially thank Sabine who started the collaboration with Sergiu M. Gorun (Department of Chemistry and Environmental Science, New Jersey Institute of Technology). This collaboration involves a part of my PhD work, which is the EPR investigation of newly developed phthalocyanines.

Phthalocyanines are the synthetic analogue of porphyrins and can be used in a wide variety of applications like dyes and pigments, photodynamic therapy, semiconductors and photovoltaics, gas sensors, catalytic materials, etc. A notable property of phthalocyanines is the tendency to stack together. However, for some applications and environmental reasons, there is the need for solubility in environmental friendly solvents. The investigated phthalocyanines do not have any C-H bond in the system and bear one of the transition metals Cu, Co, V or Zn. All the hydrogen atoms are replaced by fluorine and in the outer ring bulky perfluoro-isopropyl groups are introduced. Surprisingly, the investigated phthalocyanines are soluble in alcohols.

The intense EPR investigation consisted of continuous-wave experiments, both at X- and W-band frequencies, and pulsed experiments, like HYSCORE and Mims and Davies ENDOR. Besides the experimental work, a density functional theory study was done with the ORCA program. The spectra and calculations revealed the existence of isolated magnetic centers and an axial bonding of the solvent molecules to the metal in the center of the phthalocyanine.

I recommend every student to participate in the JEOL contest, because it is a great experience and opportunity to share and discuss your work in such a manner. The reward is not only a medal, but also an experience and a good feeling you are left with.

Hans Moons

The Bruker Prize 2010

The 2010 Bruker Prize was awarded to Dr. Ron Mason at the 43rd RSC meeting in Cardiff. In his prize lecture entitled "The fidelity of spin trapping with DMPO in biological systems" Dr. Mason gave an overview of his work in the last three decades. The prize lecture was followed by the traditional reception sponsored by Bruker BioSpin.

From left to right: Dieter Schmalbein (Bruker BioSpin), Ron Mason (2010 Bruker Prize) and David Collison (ESR Group Chair).
For details, see this newsletter, p. 17

The Zavoisky Award 2010

Hans Wolfgang Spiess

Max-Planck Institute for Polymer Research,
Mainz, Germany

in recognition of a lifetime's work in magnetic resonance and, in particular, the laureate's contribution to pulse magnetic resonance methodology in elucidating structure, order and dynamics of supramolecular systems

SEST Young Investigator Award 2009

For details, see EPR newsletter, 19/4, p. 15

Norikazu Mizuochi

I was honored to receive the young scientist award from The Society of Electron Spin Science and Technology (SEST) for "Control of single spin coherences in multi-qubit system of single nitrogen-vacancy (NV) center in diamond". This study was carried out with many collaborators and I especially thank Prof. J. Wrachtrup, Dr. F. Jelezko at Stuttgart University in Germany, Dr. Yamasaki at AIST in Japan, group members at Stuttgart University, and group members at AIST. Most of the research was carried out at Stuttgart University during 2006 to 2008. In each year, I stayed a half of a year; so totally, I stayed one and half year in Germany.

I investigated a single NV center in diamond, which has been expected as a resource for quantum information devices. Especially, I had an idea to investigate the nuclear spin of ^{13}C in the diamond lattice for increasing the number of qubits and for elucidation of the relaxation mechanism of the electron spin of a single NV center. By using ^{13}C, we realized a three-qubit system and generated entanglement among them. For the first time the generation was in solid material. Furthermore, we could reveal the relaxation mechanism of T_2 of the electron spin and implemented the longest T_2 of the electron spin in a solid at room temperature. These studies were published in Science, 320, 1326 (2008), Nature Materials, 8, 383 (2009), and Physical Review B, 80, 041201(R) (2009). Recently, I constructed a homebuilt confocal laser microscopy system with magnetic resonance at the Tsukuba University. Now, I enjoy the single spin research in Japan. I really appreciate the award and encouragement by the members of SEST.

Mayumi Yamato

I was honored to receive the SEST Young Investigator Award for my study of noninvasive analysis of redox status in transient MCAO mice and rats. This study was conducted with many collaborators and I especially thank Professor H. Utsumi at Kyushu University.

I am presently working at Innovation Center for Medical Redox Navigation in Kyushu University and I have clarified the mechanism of oxidative stress in animal disease models. We can demonstrate brain redox alterations in the animal disease models noninvasively, using in vivo ESR spectroscopy and Overhauser-enhanced magnetic resonance imaging (OMRI). To clarify the in vivo generation of free radicals and their location in the brain, we used spin probes as redox-sensitive contrast agents. I am currently engaged to assess the therapeutic effect of medicine or supplement in the rat brain after ischemia reperfusion. I also would like to investigate the redox status in the brain of dopamine-related disease model using OMRI because dopamine-related diseases such as Parkinson's or schizophrenia are associated with the redox imbalance in vivo. In addition, I am interested in the relationship between lifestyle-related disease and brain dysfunction.

I would like to have an opportunity to learn more about many interesting topics, such as biological systems, disease mechanisms, or development of ESR apparatus, and to make good use of this experience for my future research and to contribute to this exciting field.

Takayuki Kumada

I was honored to receive a 2009 SEST Young Investigator Award for my ESR study of molecular motions and low-temperature chemical reactions in cryocrystals using solid hydrogen matrices. I especially thank my colleagues, Prof. Kumagai and Prof. Miyazaki of Nagoya University.

The matrix isolation is a convenient technique to stably trap free radicals for ESR spectroscopy; however, the inhomogeneous electric and magnetic intermolecular interactions inevitably broaden ESR lines. We focused on a solid parahydrogen matrix, which has no nuclear magnetic moment and a very small intermolecular electric interaction. Using the parahydrogen, we have reported very sharp ESR lines of trapped electron, such as H, C_2H_5 [JCP 2001], H_6^+ [JCP 2007], etc. It should be stressed that the H_6^+ lines are the first and exclusive spectroscopic data of hydrogen radical ions.

I am also interested in pressure effects. Since solid hydrogen is soft and sparse, we can very easily obtain remarkable pressure effects. I found that the libration amplitude of O_2 in solid hydrogen increased with increasing pressure, that is, the O_2 rotates more freely in smaller cages of pressurized solid hydrogen [JCP 2002]! I hope that these findings contribute to the general understanding of low-temperature reactions and chemical reactions in condensed media.

Another Passion

Curve sketching and line etching

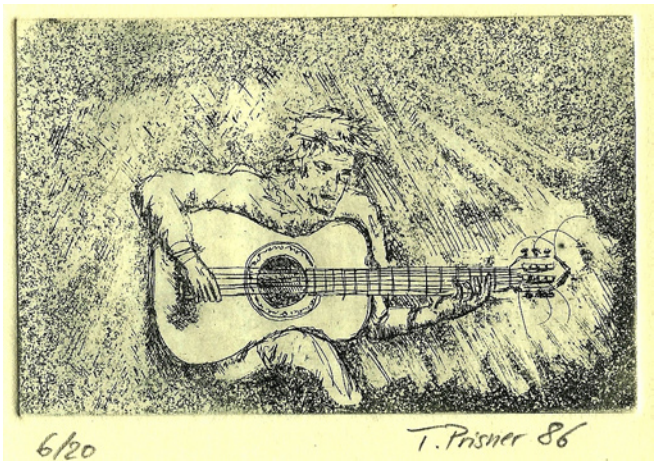
Thomas Prisner

Old House Ruhrgebiet

I want to start this short article with a disclaimer: I am not retired yet! Why am I writing this article then anyway? With all the effort and love Laila puts into each issue of the *EPR newsletter* it is impossible to resist her charming and continous invitation on the long term – especially if you are co-editor (with permanent remorse not to be on time and not contributing as much as you should) being called up in emergency! So I thought that with this article I could at least say "Thank you" to Laila for her superb work!

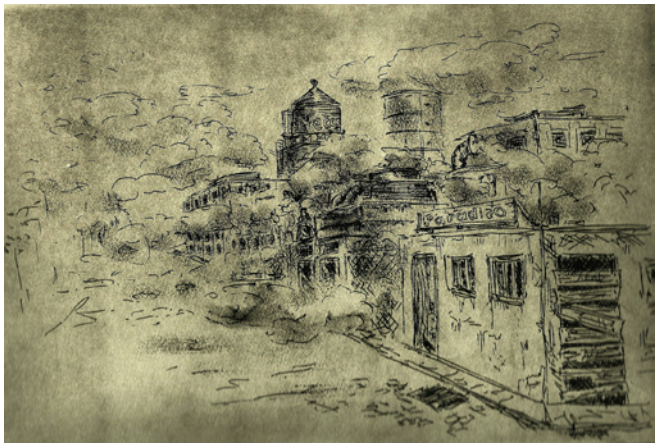
One of my passions (beside science) is painting. That seems to be genetically (or socially) programmed: my grandfather, grandmother, uncle, and cousin all share this passion. The most important guide for me and my siblings was clearly our mother.The smell of fresh painting oil was a natural odor, as well as easel in the living room and exhibition of new pictures in the stairway of our house. I explored painting in oil, crayon, guache and water colors as well as drawing with Indian ink and pencil. While doing my PhD thesis at Dortmund University I learned the technique of etching and immediately fell in love with it. The combination of art, chemistry and mechanical working was and is a wonderful relaxation for me – unfortunately to seldom lately! Usually I scratch into the cooper plates, which are covered with an acid resistant varnish, motives I have sketched before in ink; mostly architecture and landscapes. After the etching process the most exciting part starts: the cleaned plate is dipped in-depth with the etching ink to push the ink into the tiny etched lines. Then the color is carefully removed with tampons from blank surface, carefully avoiding off-take from the etched groves. This is a rather lengthy procedure and the finish is best done by the hell of the hand. I remember that in the beginning I used my chemistry lab coat to protect my other clothes from the strong etching ink and to clean my ball of the thumb with it, until the white coat was black all over and inflexible from the etching ink. After the etching press has been adjusted for the right amount of pressure and the vat paper (watered a day before and then

Leaving Heidelberg

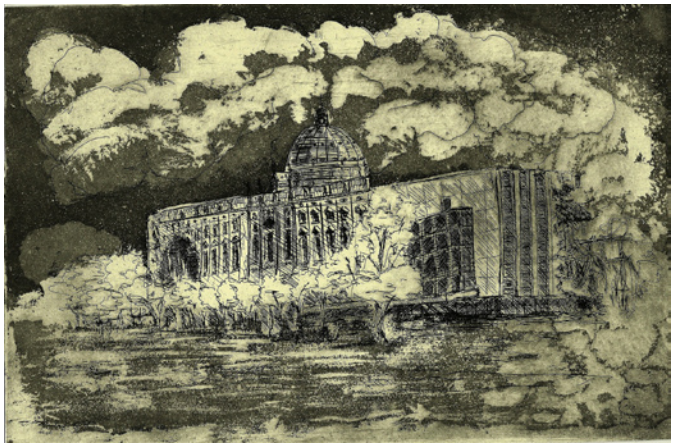


Guitar Player

Boston Indian Summer



Necco Candy Factory Cambridge



Berlin Metamorphose

stored between cardboards) was tested for the right amount of wetness, the ceremony starts: the plate is placed on the metal table of the press, covered by a virgin piece of vat paper and the etching felt and is then wheeled through the press by hand. Full of anticipation, the paper is finally taken off the plate and if everything went right there is a very nice moment of excitement and joy! Somehow all that is not that far away from scientific experiences and practices! Usually it does not work out in the first place and the pressure of the metal cylinder, the ink consistency, the temperature of the copper plate and the wetness as well as the weight and thickness of the paper have to be adjusted and optimized; usually it takes a whole day to print a couple of etchings! Unfortunately a rare but always rewarding day spent in the basement, with black fingernails for the next week.

Church and Waterfall

The etchings shown follow the steps of my scientific career. The first etching shows the gate at the old bridge of Heidelberg, where I studied Physics and did my Diploma thesis. The Guitar player is also a memory back to this time. The Villa is done by a soft etching technique, it is a motive taken from one of the weekend hikes together with my wife in the very nice Ruhr valley. From my time as a postdoc at MIT results the view from our apartment window in Brighton in fall and the view on the candy factory, which resided on the other side of the Francis Bitter National Magnet Laboratory at that time and produced permanent sweet smelling clouds. The etching showing the transformation of the 'Palast der Republik' (the former DDR house of parliament) back to the Berliner Stadtschloss reminds me of my time at the Free University in Berlin. The small postcard etching shows the school of Bad Vilbel, a small village close to Frankfurt, where I am living with my family now. The color-etching of winter in Wawautosa is a memory of my sabbatical stay at the Medical College of Wisconsin in 2006. Finally I show a rather old etching of an orthodox church in a waterfall – a motive which I found searching for etchings which fitted to my scanner size. It remind me very much of my visit to Kazan, and therefore it seems to me like this closes the story nicely.

Bad Vilbel Stadtschule

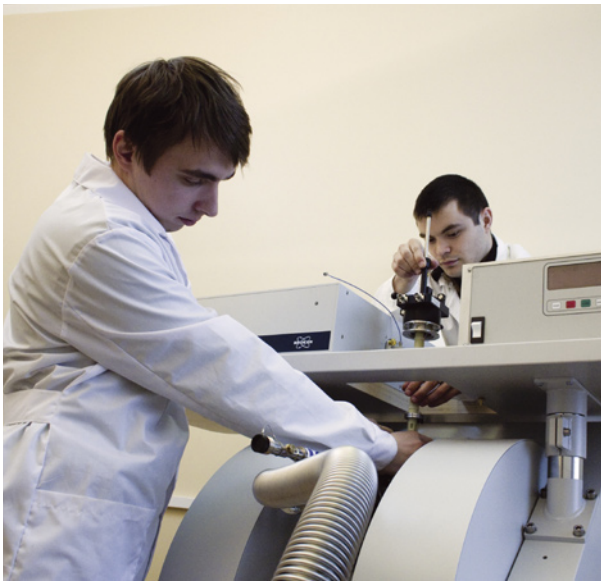
Milwaukee Winter

65 Years of the Zavoisky Physical-Technical Institute

On April 13, 1945 the Government of the USSR resolved to found the Kazan Branch of the Academy of Sciences of the USSR. The decree of the Presidium of the Academy of Sciences of the USSR on August 28, 1945 established the Kazan Physical-Technical Institute (KPhTI).

At first the institute consisted of four departments. The Physics Department was headed by Evgeny Konstantinovich Zavoisky who organized its work so that it combined fundamental research, development of applications and close interaction with the universities. Nowadays in KPhTI, these traditions are kept up. In fact, KPhTI is a result of the development of this Physics Department. We consider E. K. Zavoisky as the founder of KPhTI, and in 1984 it was named after him.

Evgeny K. Zavoisky (center) with his friends and colleagues, Semen A. Al'tshuler (left) and Boris M. Kozyrev (right). Kazan, 1968.



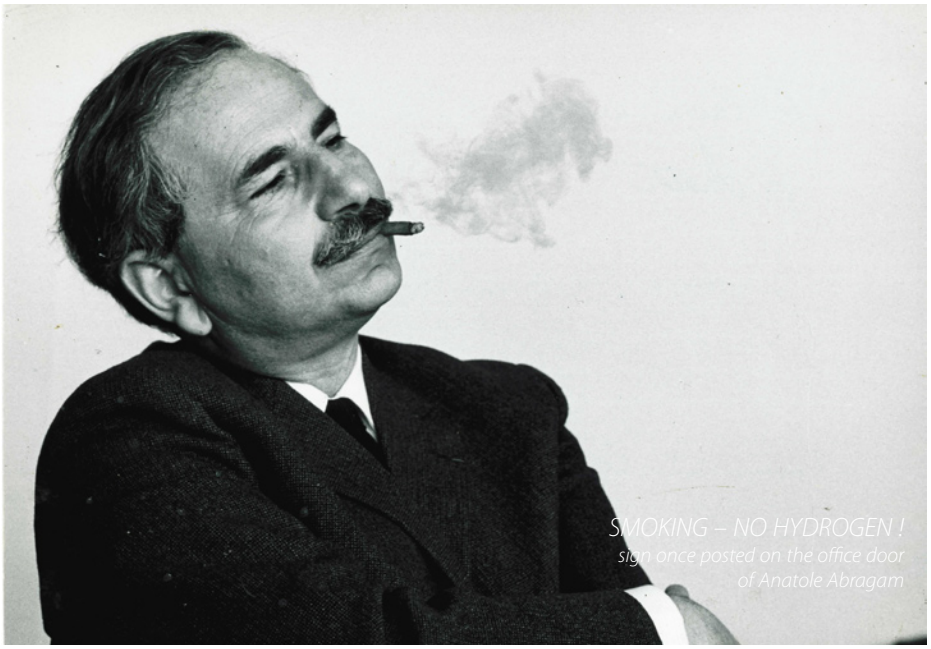
Wresting the secrets of Nature. Zavoisky Physical-technical Institute lab, Kazan, 2010.

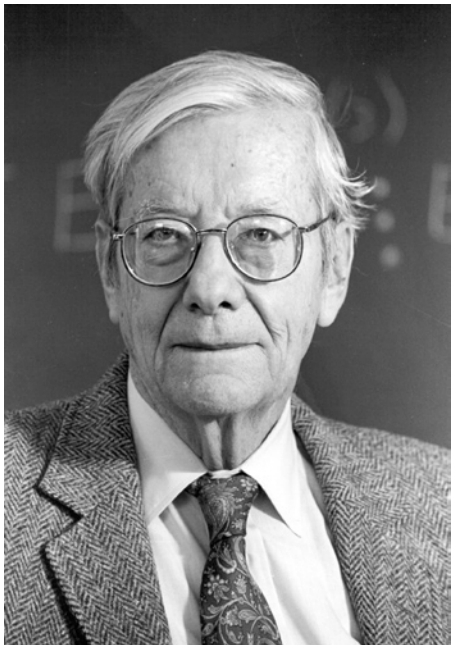
In 1947, B. M. Kozyrev and S. G. Salikhov for the first time detected the EPR spectrum of free radicals. In 1948, S. A. Altshuler, B. M. Kozyrev and S. G. Salikhov observed the effect of the hyperfine interaction in the EPR spectrum of a solution of Mn^{2+} salts. In the fifties the academician K. A. Valiev worked at the KPhTI and at that time the Altshuler-Valiev mechanism of relaxation of paramagnetic complexes was proposed. In 1957 B. M. Kozyrev, N. S. Garif'yanov and M. M. Zaripov measured the magnetic moment of the ^{57}Fe isotope. In 1962, U. Kh. Kopvillem and V. R. Nagibarov theoretically predicted the photon echo. At present, optical echo-spectroscopy is a special field of science. I. A. Safin was the first to implement the pulse NQR experiment. The phenomenon of the electro-acoustic echo was discovered by I. A. Safin, A. R. Kessel and their colleagues from the Ioffe Physical-Technical Institute (Leningrad). E. G. Kharakhashyan and his colleagues for the first time observed an EPR spectrum in superconductors and an electron spin echo in metals. V. A Golenischev-Kutuzov (acoustic paramagnetic resonance) and Yu. V. Yablokov (spin clusters, Jahn-Teller effect studies) contributed to the achievements of KPhTI. E. K. Zavoisky initiated research on ion implantation, which resulted in the discovery of the phenomenon of laser annealing of implanted surfaces. This list could be continued but I limit myself to these examples from our history.

Today KPhTI is a leading institution in Russia in the field of EPR, a scientific radiospectroscopy center recognized worldwide. The main fields of our research are characterization of superconducting materials, nanocontacts, composite materials for optoelectrtonics and spintronics, and molecular magnets. We have promising results in optical echo-spectroscopy, nonlinear quantum optics and spin chemistry. Topical investigations of perspective materials, molecular and spin coherency are oriented at molecular electronics. Our institute has developed and manufactures medical whole-body magnetic resonance tomographs. Over 20000 patients have already been examined by our tomographs. Half of the scientific staff combines research with lectures at various Kazan universities. KPhTI hosts the Chair of Chemical Physics of the Kazan State University. We enjoy collaboration with many colleagues from both Russian and foreign universities and institutes.

I think that we can meet tomorrow with optimism. We have highly qualified scientists, a lot of modern scientific equipment and strongly motivated young researchers. We have support of the society, the Russian Academy of Sciences, and the Government of the Republic of Tatarstan. We are open to the challenges of the future. We believe in our success.

Kev Salikhov





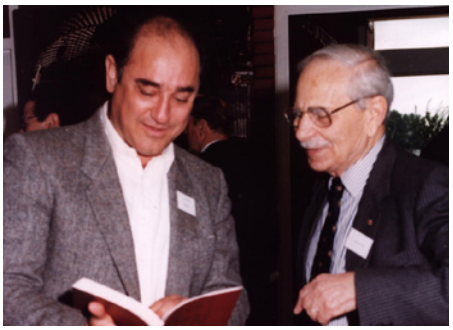
Ninety-five years and still going strong

Dear Anatole, Congratulations on your 95th birthday! You are one of the great scientists of our time. Not an atomic physicist or a condensed matter physicist or a nuclear physicist ... but a Physicist with a capital P, a rare and vanishing breed of universal scholar. You have helped to define and shape the very foundations of our field and you have been an author for two updated testaments of the bible, thereby serving as a mentor and guiding light for generations of aspiring and accomplished scientists. Your attempts to escape the limelight have been in vain and you continue to attract awe and adulation from all corners of our community. You have been a world leader in the planning and organizational dimensions of French and international science, helping to cultivate the prominence and vitality of our chosen field of magnetic resonance. Beyond your science, scholarship and leadership, you are an individual distinguished by great erudition, multinational culture, graceful wisdom and piercing wit. You have taught us much and we owe you a debt of eternal gratitude.

Much about your extraordinary scientific contributions and your magisterial observations and comments has been spoken and written in many venues, including this Newsletter volume 14 number 4 (2005) on the occasion of your 90th birthday, and in your own remarkable autobiographical works. Abundantly dispersed within the pages of these written contributions are also anecdotes about you, characterized by a brilliant sense of humor and an uncanny grasp of the subtleties of language. We encourage our colleagues in the magnetic resonance community to revisit the wonderful documented story of your life.

Anatole, you have been a dear friend to many of us for so many decades--we treasure your friendship among our prized possessions. May you and Nina continue to live a vibrant, inspirational life and to enjoy many more years of health, happiness and relaxation.

Erwin Hahn and Alex Pines



Nicolaas Bloembergen:

an interview to the *EPR newsletter*

EPR newsletter: *Dear Professor Bloembergen, on behalf of the readers of the EPR newsletter we congratulate you on your 90th birthday. We are most appreciative that you agreed to answer the questions of this interview. Why did you start towards your career in science?*

I found physics the most intellectually challenging subject in my high school curriculum. I attended a Latin school called gymnasium in my native country of the Netherlands. At the age of ninety I find it even more challenging. During the past 50 years my main interest has shifted from EPR to Nonlinear Optics.

What do you think about the young generation of the EPR researches and what is your message to them?

I have found the present young generation of students in the sciences equally motivated as 70 years ago.

What would you have done if given a different opportunity?

I cannot answer the last question. The opportunities in physics were always dominant.

Guest of the issue

Richard R. Ernst [1]

The Follies of Citation Indices and Academic Ranking Lists A Brief Commentary to 'Bibliometrics as Weapons of Mass Citation' [2]

The account by Antoinette Molinié and Geoffrey Bodenhausen on 'Bibliometrics as Weapons of Mass Citation' [3] presents a lucid indictment on the current misuse of citation numbers and of science rankings. In the face of ratings and rankings by merely counting citations like nit-picking, the outcry of two concerned researchers necessitates no corollary or further supporting arguments. The present hype of bibliometry made it plainly obvious that judging the quality of science publications and science projects by bibliometric measures alone is inadequate, and reflects the inadequacy of science management regimes staffed by non-scientific administrators or by pseudo-scientists who failed to develop their own personal judgment.

Today, an erroneous conviction prevails that institutions and individuals of 'value' can be measured ultimately in terms of a single number that may form part of a competitive 'ranking list'! Only nobodies and nameless institutions never ever appear in a ranking! Today, an uncountable number of granting and promotional decisions are taken based on such superficial and misleading lists. – The absurdity of such a craze may best be enlightened by a comparison with non-scientific fields: Who would ever select top musical performers just by the number of references in newspapers, irrespective whether the reviews are favourable or not? Who would ever qualify renowned painters based on the number of 'quotes' in the form of plagiary borrowings by less creative artists or by plain copyists? Who knows, soon also Nobel Laureates in literature will be selected based on citation indices! – Fortunately, very fortunately, most of the great human minds of the past had not yet to worry about the mediocrity of rating agencies. Otherwise, human history would have taken a different course; and many of the greatest human achievements would never have been made. Our pride of being the most creative species ever living on earth would then be plainly ridiculous.

The only question that remains to be answered, after having read the pertinent account by Molinié and Bodenhausen, is how can we stop this degrading bureaucratic regime of ranking and citation agencies and their mindless fan community? – In the following, I would like to propose a number of remedies to save the dignity and creativity of scientists and researchers.

i) Let us formulate a creed of scientists and researchers of all kind: Never ever use, quote, or even consult science citation indices! Let us appeal to the pride and honesty of researchers to derive their judgments exclusively by careful studies of the literature and other scientific evidence. It is better refuse to comply with requests than to base your judgment on numeric bibliometric indicators! Let us incorporate this creed into our teaching, discrediting 'number games' as incompatible with our goals of objectivity, credibility, fairness, and social responsibility, as researchers.

ii) Let us establish, on the Internet, a generally accessible Webpage to list agencies, journals, and individuals who regularly use and misuse bibliometric measures in their judgements. Let us encourage researchers to add their critical commentaries to this database to identify notorious violators of the above creed. We may call this database 'Bibliometric Discredibility Pillory' or BDP. It could be that an enthusiastic bibliometrics fan might even be inclined to apply the standard bibliometric evaluation tools to this database to ▶

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[3] A. Molinié and G. Bodenhausen, *Chimia*, **2010**, *64*, 78–89.

establish a 'Bibliometric Discredibility Index' or BDI to identify the worst offenders of academic credibility.

iii) Let us discredit specifically rating agencies and their managers that have established and regularly publish science citation indices and university ranking lists; agencies that enrich themselves on the account of science quality, and cause more harm than good. Let us urge funding agencies to never ever support projects that intend to further extend bibliometrics based on merely counting citations.

It is only by this kind of active resistance to the follies of bibliometrics that our scientific self-respect and credibility can be saved. We should liberate our minds again to enable true creativity in view of long-term social benefits. We certainly do not want to convert our precious universities into bureaucratic training centres for mindless citation hunters! Our institutions shall remain for ever unbiased resorts of limitless human dignity and foresight.

We are deeply convinced that human ingenuity and creativity are beyond all conceivable quantitative measures. We know that human beings are singular in their qualities (and their deficiencies). In order to apply justice to them, we have to respect them as individuals, each with his own particular gifts. Let us try to understand researchers and their creative output, but not attempt to compare or rank them! Whenever ill-conceived bibliometric measures are being applied, it means that non-quantifiable extraordinary achievements are cropped such that they become commensurable with the mediocrity of routine research. In this way, science loses all its outstanding features that could justify also outstanding supporting efforts. Bibliometrics may indeed turn out to become the ultimate tombstone of veritable science.

And as an ultimate plea, the personal wish of the author remains to send all bibliometrics and its diligent servants to the darkest omnivoric black hole that is known in the entire universe, in order to liberate academia forever from this pestilence. – And there is indeed an alternative:Very simply, start reading papers instead of merely rating them by counting citations!

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Notices of Meetings

Asia-Pacific EPR/ESR Symposium 2010
Jeju, Korea,
October 10–14, 2010
www.apes2010.org

APES 2010 will cover the frontiers of all aspects of EPR/ESR ranging from theoretical and experimental advances in CW EPR/ESR, pulsed EPR, high frequency and high field EPR, ENDOR, time resolved EPR, FMR, EPRI, CIDEP and ODMR to applications in medicine, biology, chemistry, materials science and nanotechnology.

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EPRBioDose2010
Mandelieu La Napoule, France,
October 10–14, 2010
www.iss.infn.it/eprbiodose

EPRBioDose is actually two conferences in one: the International Symposia on EPR Dosimetry and Dating (EPR) and the International Conference on Biological Dosimetry (BioDose).

Topics: Biological and biophysical indicators of exposure / Retrospective dosimetry / Dosimetry in accidental situations and emergency response / Dosimetry in radiation therapy / Dosimetry in radiation processing / Instrumentation improvements / Fundamental mechanisms of radiation effects / New dosimetric materials / Dating

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The 49th Annual Meeting of the Society of Electron Spin Science and Technology (SEST2010)
Nagoya, Japan,
November 11–13, 2010
bio.phys.nagoya-u.ac.jp/sest2010

SEST2010 will be held at Symposion Hall in Toyoda Auditorium of Nagoya University during November 11–13. This is the 49th Annual Meeting of the Society of Electron Spin Science and Technology. The annual meeting will cover the wide range of EPR/ESR applications in physics, chemistry, biology and medicine. Participants from all over the world are welcome. The deadline for the registration is September 3, 2010. For further information, please see the website or contact:

Shin-ichi Kuroda (Chairperson), Hisaaki Tanaka (Secretary), Organizing Committee,
e-mail: sest2010@bio.phys.nagoya-u.ac.jp

EPR Community in Slovenia – a Success Story

Marjeta Šentjurc, Pavel Cevc, Robert Blinc, Janez Štrancar and Denis Arčon
Institute Jožef Stefan, Jamova 39, 1000 Ljubljana, Slovenia

1 Beginnings of EPR in Slovenia

It is difficult to imagine how such a small country as Slovenia, with only about 2 million citizens and being independent only from 1991, has such a long and rich history of research, in particular in natural sciences like physics and chemistry. The two main research institutions, Institute Jozef Stefan and University of Ljubljana, represent the heart of this vibrant society where the EPR community plays an important role and worth recalling its "historical" results and reviewing present activities.

It all began in early sixties with Professor Savo Poberaj who built the first X-band EPR spectrometer. The difficulties in accessing the required electronic components forced him to improvise and invent many details on his own, like the application of circulators instead of at that time more conventional magic T's. Circulators are today used in most of the modern X-band EPR bridges as they significantly simplify their operation and decrease the insertion losses. Many discoveries actually brought our researchers (Figure 1) onto the EPR frontier already at that time and allowed homebuilt spectrometers to be used for almost two decades until a Varian E-9 spectrometer arrived in 1971. However, the tradition of making our own EPR spectrometers continues to the present time. Our laboratories thus enjoy a rare luxury of complementing conventional CW and pulsed X-band EPR spectrometers with low-frequency EPR spectrometers (50–250 MHz and 1.2 GHz L-band spectrometers) and high-frequency (35 GHz Q-band) spectrometers.

Studies of ferroelectric materials was for many years one of the main research topics in the group of Professor Robert Blinc at the Institute Jozef Stefan. The long-time debate in this field was about the nature of ferroelectric transition, i.e. whether it is of displacive or order-disorder type. KH_2PO_4 and KH_2AsO_4 were considered as model ferroelectric systems so many groups focused on these systems. One of the key experiments that finally settled the issue of ferroelectric transition in KH_2AsO_4 was an EPR study of γ-irradiated samples. The γ-generated electron is captured by the AsO_4^{3-} units forming EPR active AsO_4^{4-} centers. The room temperature EPR spectrum is composed of quartet lines due to the hyperfine interaction with the As nucleus (I = 3/2) further split by superhyperfine interaction with 4 surrounding protons resulting in quintet EPR spectrum. As it was shown in a seminal work by Blinc, Cevc and Schara [1] when samples are cooled below ~220 K, the EPR spectrum suddenly changes to a triplet (Figure 2). This experiment unambiguously proved that hydrogen atoms perform hopping types of jumps in the O-H...O hydrogen bonds providing direct evidence for the order-disorder type of transition in KDP-type ferroelectrics.

Fig. 1. The core of the EPR society in Slovenia for many years: dr. Pavel Cevc (left), dr. Marjeta Šentjurc (middle) and prof. dr. Milan Schara (right).

Applications of EPR techniques gradually spread from solid state physics to life sciences and opened new collaborations in the early seventies. An excellent example is the EPR study of caries resistance of human teeth. The main unresolved issue was whether the organic or the inorganic component of the enamel is responsible for most of the resistance of teeth to caries. Careful examination of CO_3^{3-} defects demonstrated that that resistance against caries is closely related to a hydroxyapatite micro-crystalline alignment in the tooth enamel [2]. The applicability of the EPR method in biophysics research is largely connected with the synthesis of suitable spin labels. This method was introduced by Prof. Slavko Pečar, Faculty of Pharmacy at the University of Ljubljana, who succeeded in selective labeling of the active site of acetycholinesterase (AChE) which is one of the most relevant enzymes for nerve response. EPR spectra of spin labeled fluorophosphates (inhibitors of AChE) hold the information about the AChE's pocked-like structure and its size [3]. These results were validated only fifteen years later by X-ray crystallography [4].

The research on liposomes as a possible drug delivery systems started in collabora-

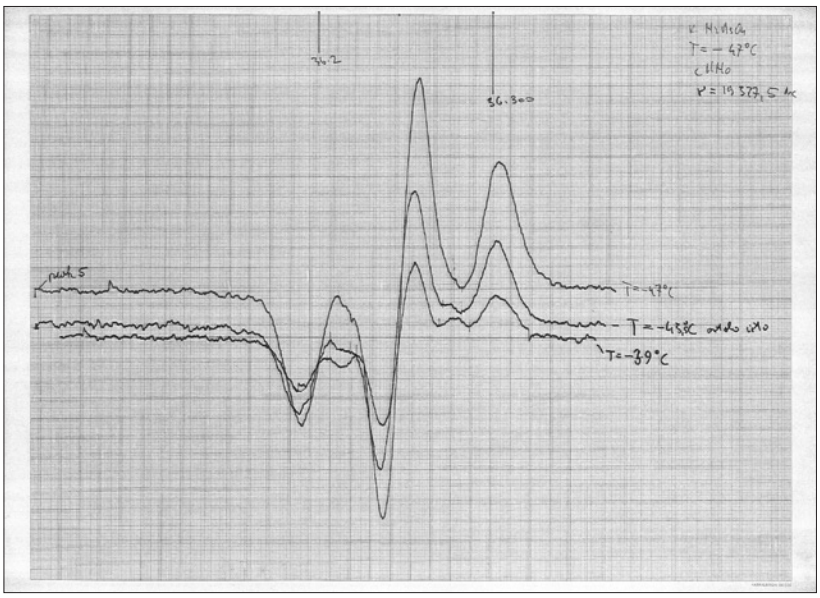

Fig. 2. A copy of EPR spectra measured on γ-irradiated KH_2AsO_4 single crystal at ν_L =19.3 GHz during the visit of dr. Pavel Cevc at prof. K. A. Müller, IBM research center in Zürich, in September 1966.

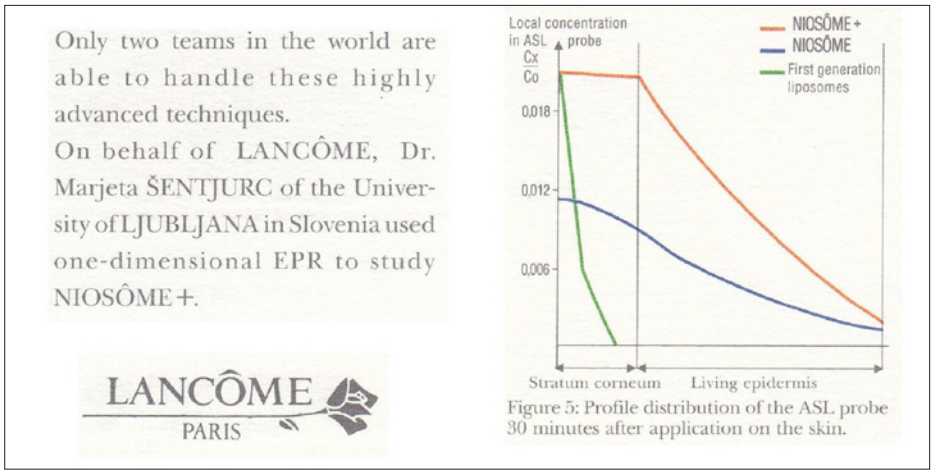

Fig. 3. A copy from the L'Oreal commercial flyer where EPR measurements performed by dr. Marjeta Šentjurc et al. are acknowledged.

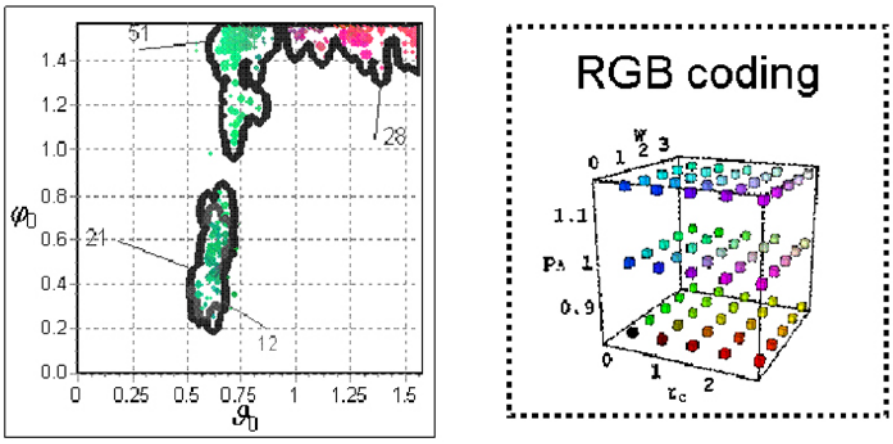

Fig. 4. An example of a GHOST condensation plot, describing significant motional patterns of spin probes in biological membranes. The θ and φ angles represent the opening and anisotropy wobbling cone angle of the spin probe, while the color of the points codes the relative values of the rotational correlation time, additional broadening constant and polarity correction factor in their definition intervals as displayed in the color legend on the right

tion with the Faculty of Pharmacy, University of Ljubljana. It was demonstrated that liposomes can facilitate the transport of drugs into the skin, but the mechanism and the optimal composition of liposomes was still a matter of further investigation. The reliability and usefulness of our 1-D EPR kinetic imaging [5] of the transport of liposome entrapped spin labeled molecules was proven through our extensive collaboration with the cosmetic company L'Oreal, Paris in the period from 1991 to 1998. Our EPR measurements were correlated with in vivo studies and ultimately helped in the selection of the liposome delivery system (noisome+) for skin care application (Figure 3).

2 Present Biophysics EPR research activities

Currently, the Laboratory of Biophysics – EPR Center mainstream activity focuses on X-band CW EPR as a structure-determination tool based on our developments of EPR spectra analysis, well-posed parameterization and inverse problem solving as well as on the development of GHOST condensation (Figure 4), enabling user-independent high-throughput motional pattern detection in various spin-labeled samples (BMR, vol. 27. ed. HEMMINGA et al., Springer 2007). This has provided us the opportunity to explore various membrane systems and track their responses to different bioactive-molecules.

By unraveling the motional restriction data from high-throughput site-directed spin labeling experiments and coupling it with the modelled local rotational spaces we can even navigate the tuning of the global protein conformation. By detecting the coexisting motional pattern even at physiological temperatures, families of the possible global protein conformations can be revealed, thus describing the protein system much more realistically [6]. Since the local motional restrictions are derived within EPR nanosecond time windows, even very short-lived protein structures can be characterized, as demonstrated for intrinsically disordered proteins that whose structures last only for a short time and only in the presence of a biological partner [7] (Figure 5). The latter makes SDSL EPR, in combination with structure modeling developed in the Laboratory of Biophysics- EPR center, the unique experimental methodology able to address this kind of problems of structural biology in reasonable time.

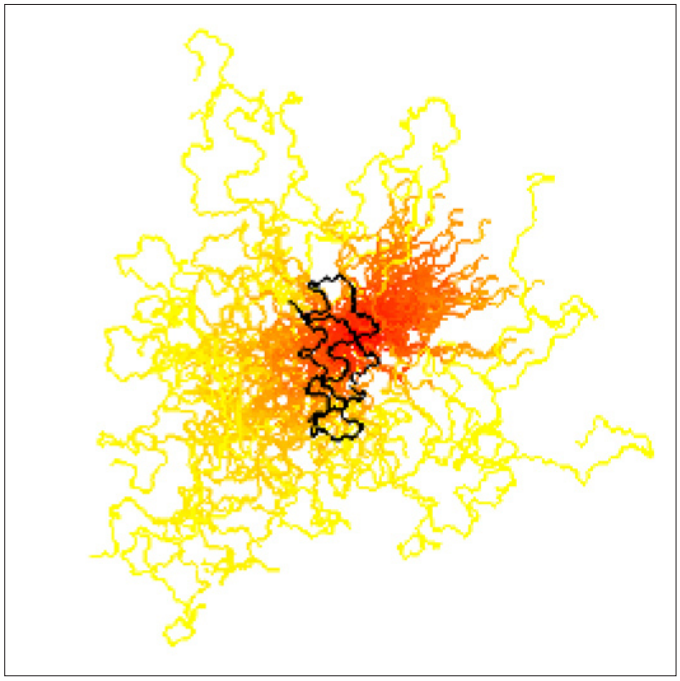

Fig. 5. Family of structures derived from SDSL EPR data of 12 variants (mutants) of the C-terminal part of the nucleoprotein of the measles virus when it interacts with its biological partner – phosphorprotein of the same virus.

Fig. 6. Components of the high-pressure EPR cell enabling low-temperature measurements at pressures up to 18 kbar.

3 Present Solid State Physics EPR research

Buckminster Fullerene C_{60} molecules appeared in the early 1990s and caused a lot of excitement in the solid state physics community and sparked a "nanotechnology revolution". Although The Institute Josef Stefan was involved in many aspects of C_{60} research from the beginning, including the unusual high-temperature superconductivity in alkali doped C_{60} [8], it is the work on magnetic properties of TDAE-C_{60} that was a highlight for many years. Tetrakis-dimethyl-amino-ethylene (TDAE) is known to be one of the strongest organic donors and when intercalated into the C_{60} structure; it thus transfers one of its electrons to the C_{60} molecule. Surprisingly, C_{60}-magnetic moments order into the ferromagnetic state below 16 K, which is unusually high for a purely organic system built only from first row elements (H, C, N). Despite some controversial results in the early days of TDAE-C_{60} research, the observation of ferromagnetic resonance [9] ultimately proved the ferromagnetic ground state. However, the origin of the unusually high transition temperature remained mysterious for few more years. As a key ingredient in the magnetism appears to be the Jahn-Teller effect which becomes static at low temperatures. The particular C_{60}-orbital order co-existing with the spin-ordered state makes TDAE-C_{60} a unique system where spin-orbit couplings dominate the low-temperature physics. This is currently being further investigated in the $(CH_3NH_2)K_3C_{60}$ antiferromagnetic system where in-depth insights into the effect of orbital ordering on the magnetic phenomena, coupled with our recent development of high-pressure EPR resonators (Figure 6) with high Q-values (up to 3000) and high filling factors, has provided us the necessary enhanced detection sensitivity. The effect of hydrostatic pressures is truly dramatic and can be explained by the orbital liquid-orbital ordered phase transition provoked in the compressed geometries.

4 Conclusions

EPR in Slovenia is a story of success, resulting in a number of internationally recognized achievements. The results stem from the unique combination of developments of novel experimental techniques, their direct applications to the basic science investigations in physics and biophysics and their coupling to the applied type of research. The state of the art of equipment and the popularity of EPR studies among students make our present and future very bright.

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EPR2010 – A Joint Conference of the 14th In Vivo EPR Spectroscopy & Imaging and the 11th International EPR Spin Trapping/Spin Labeling Meetings

San Juan, Puerto Rico, May 2–6, 2010

www.epr2010.org

The EPR2010 conference was held at the Condado Plaza Hotel in San Juan and was organized by Balaraman Kalyanaraman (Medical College of Wisconsin) and Antonio Alegria (University of Puerto Rico, Humacao). The scientifically productive meeting focused on a wide spectrum of EPR methods and applications including spin trapping, spin labeling, in vivo EPR spectroscopy, EPR imaging, radiation dosimetry by EPR and state-of-the-art EPR instrumentation for chemical and biological systems. There were 118 scientific participants from 17 different countries, including graduate students, postdoctoral fellows, young investigators and senior scientists.

Plenary lectures were given in the EPR Instrumentation session by James Hyde, Wojciech Froncisz, Gareth Eaton, Jack Freed, and Wayne Hubbell (organized by Balaraman Kalyanaraman) to open the meeting. Other scientific sessions (and organizers) included Protein Structure and Dynamics by Pulsed EPR (Candice Klug), In Vivo EPR Spectroscopy and Imaging (Harold Swartz), EPR and Spin Trapping in Redox Biology (Neil Hogg & Jeannette Vasquez-Vivar), Spin Trap/Spin Label Synthesis (Micael Hardy), EPR Techniques in Metalloproteins (Sandra Eaton), Spin Labeling in Membranes (W. Karol Subczynski), In Vivo Oximetry and Redox Imaging (Hideo Utsumi), Spin Traps and Nitroxides in Translational Research (Marcos Lopez), Free Radicals in Rare Diseases (Maria Kadiiska), Novel Actions and Reactions of Quinones (Tadeusz Sarna), EPR Dosimetry (Harold Swartz) and selected Short Oral Communications. Nearly 50 posters were presented in addition to the 69 oral presentations. The Annual General Meeting of the IES was also held in conjunction with this conference.

From left to right: Balaraman Kalyanaraman and Antonio Alegria.

The meeting was generously supported by a number of sponsors, including the Medical College of Wisconsin, the University of Puerto Rico, Clin-EPR, Resonance Research, GE Healthcare, Thadikonda Research Foundation, Bruker Biospin, and Pressure BioSciences. The co-chairs are also grateful for the support of the administrative staff in the Department of Biophysics (Medical College of Wisconsin) and LLC Management (Puerto Rico) as well as many other meeting sponsors. The conference banquet and luncheons showcased Puerto Rican cuisine and the famous island weather did not disappoint during excursions into Old San Juan, through El Yunque Rainforest, kayaking in bioluminescent waters, or enjoying our beach-side location between the Atlantic Ocean (see conference photo) and Condado Lagoon.

The next joint conference will be hosted by Dartmouth Medical School (New Hampshire) and organized by Harold Swartz. The tentative dates for EPR2012 are September 10–14, 2012 and information will be posted on their EPR Center website www.dartmouth.edu/~eprctr and in future issues of the newsletter.

Candice Klug

Are you interested in becoming a member of the International EPR (ESR) Society? Please find the registration/information form for new/continuing members of the IES and non-credit-card payment instructions for individual members on this Web site: www.epr-newsletter.ethz.ch/contact.html

The EPR community has available to it a list server.
The address is epr-list@xenon.che.ilstu.edu.
To subscribe to the list, send the words SUBSCRIBE epr-list to majordomo@xenon.che.ilstu.edu.
That sends a message to Reef Morse who will then manually place you on the list. This honors only legitimate requests to join the list. Reef also moderates the list which keeps it spam-free.

The 43nd Annual ESR Conference Cardiff University, Cardiff, United Kingdom, March 21–25, 2010

The 43nd Annual ESR Conference took place at Cardiff University, with lectures in the Large Chemistry Lecture Theatre, posters in the Viriamu Jones Gallery and the conference banquet in Aberdare Hall.

The 2010 Bruker Prize Lecture by Dr Ronald P Mason (NIEHS, USA) spoke under the title: The Fidelity of Spin Trapping. Dr Peter Hofer introduced the lecture, and there followed an entertaining and hugely informative talk from Dr Mason about the philosophy of the application of spin traps and both the limitations of their use and the fundamental understanding that they can reveal.

There were 92 attendees representing 15 different countries, and over a third of the participants (even more than in recent years) were graduate students, a situation that continues to suggest a healthy future for ESR spectroscopy.

The scientific programme was supported by social evenings and receptions sponsored by the ESR Group of the RSC, JEOL and Bruker. The free Tuesday afternoon allowed delegates the chance to explore Cardiff and have a guided tour of Cardiff Castle in the pouring rain.

Keynote lectures were presented by: Damien Murphy (Cardiff), Stereoselective interactions in asymmetric metal complexes probed by EPR spectroscopy; John Enemark (University of Arizona), Pulsed EPR Spectroscopy and DFT calculations for "difficult" nuclei and sponsored by the EPSRC National Service for cw EPR Spectroscopy; Bill Rutherford (CEA Saclay) EPR of photosystem II and Takeji Takui (Osaka), Pulse-based electron magnetic resonance spin technology and a chemists' materials challenge: A few steps towards molecular spin quantum computers and quantum information processing.

As well as the Keynote lectures we had a series of excellent invited and offered short talks, two poster sessions, the Bruker Lecture and the JEOL student talk session.

This year there were 35 posters and one was selected to win the poster prize with the traditional bottle of whisky going to Gunnar Reginsson (St Andrews) for his poster:

PELDOR measurements using spin-labelled nucleobase c that binds non-covalently to guanine opposite an abasic site in DNA.

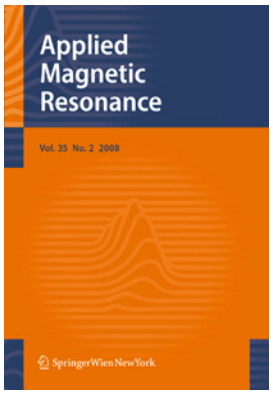
The poster prize winner and two runners-up, Petra Lueders (Zurich) with Double electron-electron resonance measured between gadolinium ion and nitroxide radical, and Igor Tkach (Gottingen) with W-band PELDOR with a dual-mode microwave resonator will receive a copy of Phil Rieger's textbook on ESR Spectroscopy, these copies being generously donated by the publishers, the Royal Society of Chemistry.

The JEOL prize medal attracted several excellent applications from which three were selected to present their talks. The JEOL prize medal for the best oral presentation by a young scientist was awarded to Hans Moons (Antwerp) for his talk: CW and pulsed EPR characterisation of soluble metal phthalocyanines lacking C-H bonds.

Joint runners-up were Lisa Castelli (Florence) with Coexistence of quantum and classical behaviour in EMR spectra of magnetic nanoparticles and molecular nanomagnets, and Richard Brown (Oxford) with Electron spin coherence times of metallofullerenes. All the student talks were of a very high calibre. The three students were also presented with cash prizes by Dr Peter Meadows (JEOL).

David Collison,
Mark Newton

New Books & Journals



Discount AMR subscription rate for IES members

Springer offers the journal *Applied Magnetic Resonance* at a special subscription rate for the members of the IES. In 2010, it is EUR 199,- (excl. VAT and carriages charges) for volumes 38 and 39 (4 issues each) (regular list price EUR 1598,- plus postage).

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Multifrequency Electron Paramagnetic Resonance. Theory and Applications

Misra, S. K. (ed.) / S. K. Misra, Concordia University, Montreal, Canada

Publisher: Wiley-VCH
Publication date: 2011
ISBN: 978-3-527-40779-8
Approx XVI, 724 pages with approx 200 figures. Hardcover
Price: approx € 169.-

Filling the gap for a systematic, authoritative, and up-to-date review of this cutting-edge technique, this book covers both low and high frequency EPR, emphasizing the importance of adopting the multifrequency approach to study paramagnetic systems in full detail by using the EPR method. In so doing, it discusses not only the underlying theory and applications, but also all recent advances – with a final section devoted to future perspectives.

Chapters:
Multifrequency Aspects of EPR (Misra)
Basic Theory of EPR (Misra)
Spectrometers: Zero-field EPR (Misra)
Low Frequency CW EPR Spectrometers (Buckmaster)
High Frequencies (Reijerse)
Pulsed Techniques (Subramanian and Krishna)
Multifrequency EPR: Experimental Considerations: Multiarm EPR Spectroscopy at Multiple Microwave Frequencies (Multiquantum (MQ) EPR, MQ ELDOR, Saturation Recovery (SR) EPR, SR ELDOR) (Hyde)
Resonators for Multifrequency EPR of Spin Labels (Hyde)
Multi-frequency EPR Sensitivity (Rinard, Quine, S. Eaton, & G. Eaton)
First Principles Approach to Spin-Hamiltonian Parameters (Neese)
Spin Hamiltonians and Site Symmetries for Transition Ions (Misra)
Evaluation of Spin Hamiltonian Parameters from Multifrequency EPR Data (Misra)
Simulation of EPR Spectra (Misra)
Relaxation of Paramagnetic Spins (Misra)
Molecular Motions (Misra & Freed)
Distance Measurements: CW and Pulse Dipolar EPR (Misra & Freed)
Determination of large Zero Field Splitting (Misra)
Determination of non-coincident anisotrpic g^2, A^2, D, and P tensors (Misra)
Biological Systems (Dzikovsky)
Copper Coordination Environments (Antholine, Bennett, & Hanson)
Multifrquency Electron Spin Relaxation Times (G. Eaton and S. Eaton)
EPR Imaging (Ahmad & Kuppusamy)
Multifrequency EPR Microscopy: Experimental and Theoretical Aspects (Blank)
EPR Studies of Nano-materials (Smirnov)
Single Molecule Magnets and Macroscopic Quantum Tunneling (Misra)
Multifrequency EPR of Photosynthetic Systems (Misra, Moebius, & Savitsky)
Measurement of Superconducting Gaps (Misra)
Dynamic Nuclear Polarization (DNP) at High Magnetic Fields (Prisner & Prandolini)
Chemically Induced Dynamic Nuclear Polarization and Chemically Induced Dynamic Electronic Polarization (Berliner & Bagryanskaya)
Future Perspectives (Misra).

For more information contact Sushil Misra (skmisra@alcor.concordia.ca)

Reader's Corner

Relaxation times review

Extensive reviews of electron spin relaxation times are in:
- K. J. Standley and R. A. Vaughan: Electron Spin Relaxation Phenomena in Solids. Plenum Press 1969.
- I. Bertini, G, Martini, and C. Luchinat: Relaxation data Tabulation, chapt. IV in Handbook of Electron Spin Resonance (C. P. Poole, Jr. and H. A. Farach, eds.) AIP Press 1994.
- S. S. Eaton and G. R. Eaton: Relaxation Times of Organic Radicals and Transition Metal Ions. Biol. Magn. Reson. **19**, 29–154 (2000)

We are gathering relaxation times to update these prior reviews. Many electron spin relaxation times are buried in papers deeply enough that they are not found by computer searches. Sometimes we find them only serendipitously. Some papers contain information that suggest to us that the lab might have measured relaxation times but did not actually put a numerical result in the published paper. We will appreciate having relaxation time values brought to our attention, so that our review can be more complete than in the past.

Gareth R. Eaton

Reader's Corner

Exciting the next Generation of Spectroscopists

by Reef Morse, Director
Steppingstone MAgnetic Resonance Training (SMART) Center

When the SMART Center began accepting students, I was certain that the application most students would gravitate towards would be the imaging experiment. Because many students in the US with science interests are visual learners (they must see something before they can understand it), EPR imaging should have played into this strength.

Boy, was I wrong!

Of the 50 students that took the week-long training sessions offered during the summer, four of them continued their research and all four chose some area of free radicals and antioxidants in food. Topics ranged from antioxidant properties of green teas to the nature of the free radicals formed during grilling. All of these students presented their work at venues and the results ranged from honorable mention at a school science fair to first in class (Chemistry) at the Detroit Science Fair. A sample of these presentations will be shown at the Rocky Mountain Conference this August.

While measuring the antioxidant properties of teas by monitoring reduction of a stable nitroxide (TEMPOL) seems straight-forward, students had to understand how to double integrate spectra with baseline correction and how to analyse the resulting data in terms of the order of the kinetics. For a high school sophmore who has not yet had calculus, this was a challenge, but the student was able to show that the more expensive and better preserved green teas had higher reduction rates and that the results could be repeated and understood in terms of collisions between molecules and the probability of a collision resulting in the reduction of the nitroxide. This is not typical of the kind of science usually taught in high school in the US.

Another student was studying free radical formation in foods as they were cooked by various means. Clearly, grilling foods produces chars which result in free radical formation, but this student took the results even further and became interested in the linewidth changes that occurred as food was progressively grilled, and the linewidth comparisons between different foods. This student was able to distinguish chars of proteins (lean meat) from chars of saccharides (starch, sugar) and could reproducibly obtain data that showed that demonstrated the presence of up to three different environments from the protein chars.

Although this may not be cutting edge spectroscopy, it is of sufficient interest to younger students that they will take the time and energy to research their results and try to understand at some level what their results may mean. These students were beginning to understand not only the complexity, but the insight that comes from self-directed research. These kids were truely excited about magnetic resonance and what they could learn from it.

On an interesting note, students as far away from Detroit as Chicago are applying for training at the SMART Center. It would appear that the willingness of entire families to accompany their kids to South East Michigan for one to two weeks, and pay for room, board, and tuition, shows a broader appeal of this kind of opportunity for students to experience science as scientists do, complete with pitfalls, disappointments, frustration, and the transcendent joy of discovering something new on your own.

Support for the SMART Center is diverse and generous. Major contributors include Bruker Bio-spin, ,the Toyota Tapestry Foundation, Steppingstone School for Gifted Education, Scientific Software Services, and a private donor who provided funds to purchase a goniometer stage from Research Specialties. My thanks to everyone who makes this adventure possible.

Notices of Meetings

Spin Chemistry Meeting 2011
The 12th International Symposium on Spin and Magnetic Field Effects in Chemistry and Related Phenomena

Hotel Witte Raaf, Noordwijk, The Netherlands, May 15–20, 2011
http://scm2011.leidenuniv.nl

Topics:
- Chemical effects of electron and nuclear spins
- Magnetic field effects on chemical reactivity
- Magnetic isotope effects on chemical reactivity
- Radical pair chemistry and physics
- Spin transport and single spin phenomena
- Electron and nuclear hyperpolarization
- Theory of spin chemistry
- Role of spin in function of photoreceptor proteins

Scientific organizer:
Jörg Matysik, Leiden
(j.matysik@chem.leidenuniv.nl)

Scientific committee:
Elena Bagryanskaya (Novosibirsk)
Samita Basu (Kolkata)
Sergei Dzuba (Novosibirsk)
Art van der Est (St Catharines)
Malcolm Forbes (Chapel Hill)
Günter Grampp (Graz)
Peter Hore, Chairman (Oxford)
Haim Levanon (Jerusalem)
Joerg Matysik (Leiden)
Hisao Murai (Shizuoka)
Michael Wasielewski (Evanston)
Markus Wohlgenannt (Iowa City)
Stefan Weber (Freiburg)
Seigo Yamauchi (Sendai)

Market Place

POSITIONS

Postdoctoral position at Physics Department, National Dong Hwa University, Taiwan

A postdoctoral position is available in the laboratory of Prof. Shyue-Chu Ke at the Physics Department, National Dong Hwa University, Taiwan.

The research will involve the application of EPR and pulsed EPR spectroscopy to understand the fundamental questions related to adenosylcobalamin-dependent enzymatic reactions.

Additional information about the laboratory is available at:
www.phys.ndhu.edu.tw/teachers/ke/ke.htm.

Applicants should have experience in analytical techniques and continuous or pulsed EPR methods and data analysis. Experimental physical chemists with experience in cell culture or synthesis would be beneficial, but is not essential.

The position is available this summer and appointments are for up to 3 years.

If interested, please send a CV and summary of previous research experience to ke@mail.ndhu.edu.tw.

EQUIPMENT

Available: EPR accessories and supplies

We have some excess EPR accessories and supplies that might be of use to other labs. For example, we have a lot of chart paper, pens and ink for older recorders, and some spare parts and accessories such as VT Dewars for older spectrometers. If you need something for an older-style Varian or Bruker spectrometer, ask us – we might be able to help. Most items are available for shipping costs.

Gareth R. Eaton geaton@du.edu

Design and construction of EPR electronics

The University of Denver can supply electronic design and construction services for EPR applications. Low-noise pulse amplifiers, low-noise 100 kHz preamplifiers, boxcar integrators, and pulse timing systems are available. We also supply a conversion kit to convert Varian field-control units to voltage-controlled scan operation. A 6-digit 1-ppm frequency counter is available in X-, C-, S-, L-band, or MHz versions. Complete microwave/RF bridges from 150 MHz to L-, S-, or C-band are available from designs previously built and tested at the University of Denver.

Please contact: Richard W. Quine,
e-mail: rquine@du.edu,
phone: 1-303-871-2419

For sale: Varian and ESR equipment

Resonance Instruments has available: (1) Replacement klystrons for Varian EPR bridges and some Bruker bridges (at reduced prices) and other klystrons; (2) Resonance Instrument's Model 8320A is a general purpose Hall-effect based magnetic field controller that provides direct control and precise regulation of the magnetic field between the pole pieces of an electromatnet. Its high resolution permits precise adjustment of the magnet's field either though the front panel keyboard or though an RS232 serial interface with your PC.

Please contact: Clarence Arnow, President, e-mail: 8400sales@resonanceinstruments.com, phone: 1-847-583-1000, fax: 1-847-583-1021.

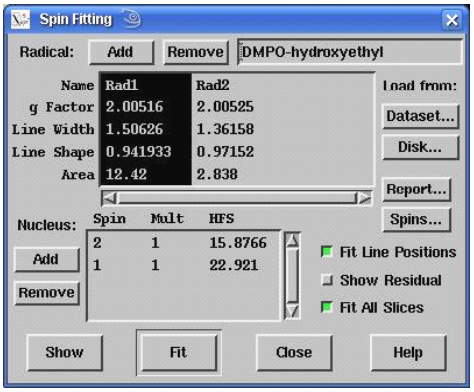
Available: Used Varian EPR equipment

(1) Varian E-104 EPR spectrometer with vertical style bridge and e-line fieldial. (2) Varian E-9 EPR spectrometer. Both available with warranty and continued service support. (3) Varian TM cavity with flat cell holders and flat cells. (4) Varian E-257 variable temperature controller with heater sensor and insert holder. (5) Varian E-272B field/frequency lock accessory.

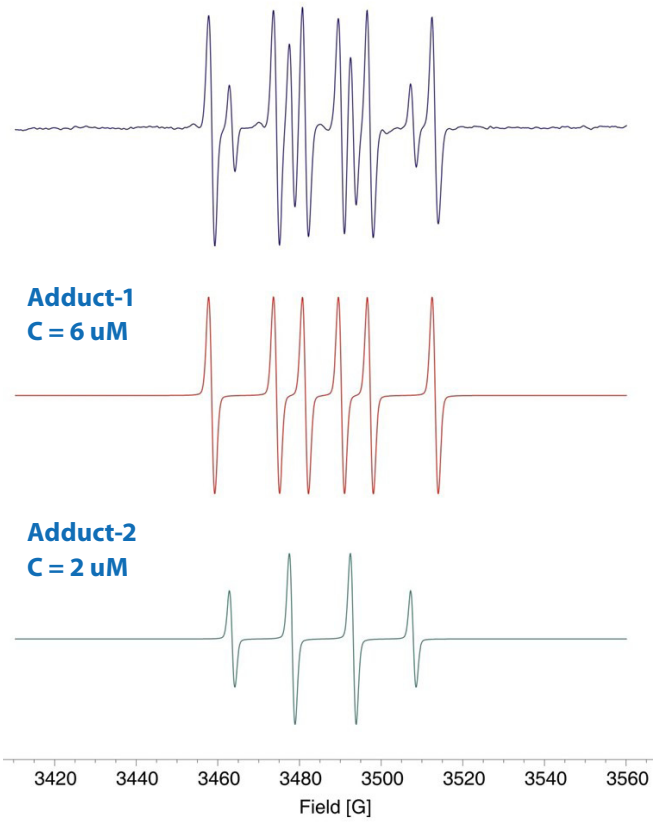
Please contact: James Anderson, Research Specialties, 1030 S. Main St., Cedar Grove, WI 53013, USA.
phone/fax: 1-920-668-9905
e-mail: janderson36@wi.rr.com

Bruker BioSpin

Easy analysis of spin trapping spectra



Dialog for the definition of spin adducts and output of numerical fitting results



Spectrum fitting results and SpinCount quantification

SpinFit

Easy-to-use software for analyzing spin trapping spectra

- Spin adduct parameter input from data base
- Fitting results as spectrum and adduct double integrals
- Precise adduct concentration from SpinCount module
- Standard on Xepr and Xenon

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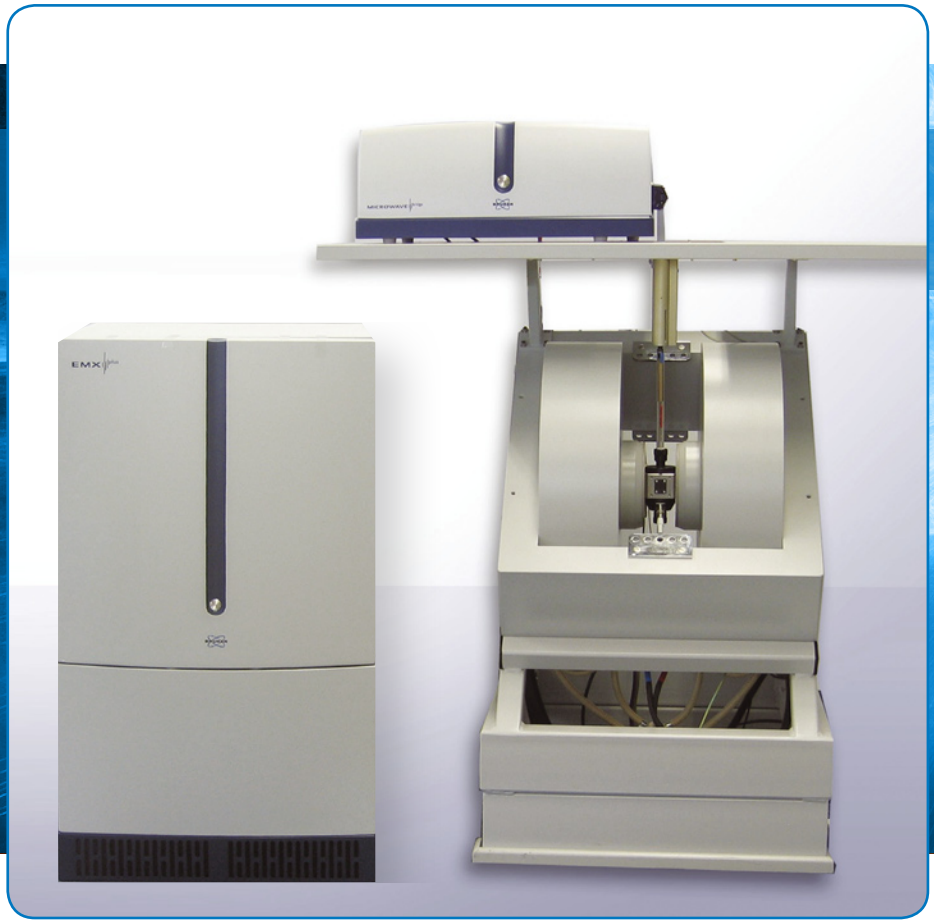
Bruker BioSpin



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- 2D_Field_Power
- 2D_Field_Delay
- 2D_Time_Field
- 2D_Field_Temp
- 2D_Field_Angle
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- Enhanced peak-picking routine with position and distance read-out
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- SpinCount, the software package for routine reference free spin counting
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- Available for EMX and ELEXSYS series

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