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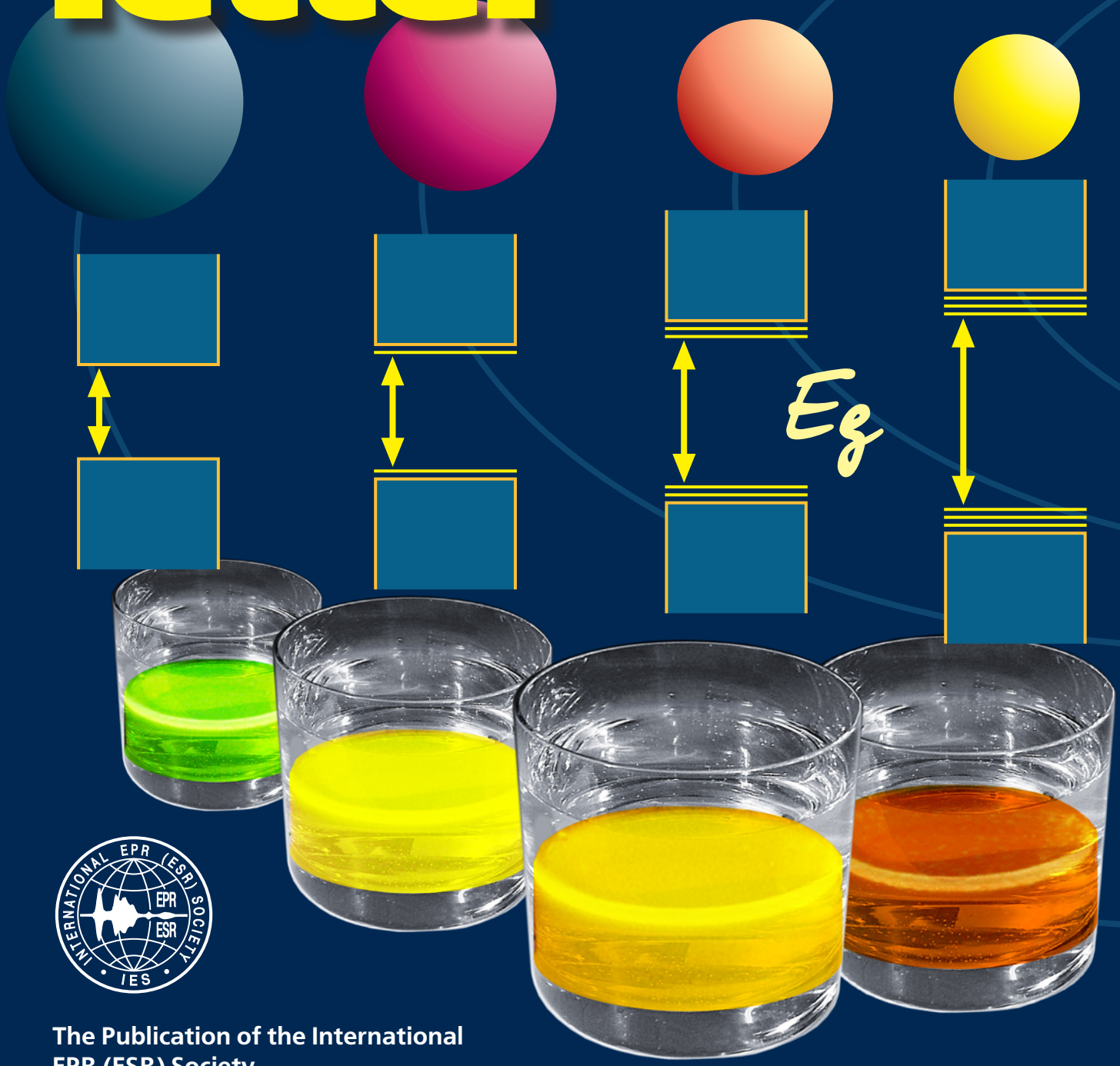

The Publication of the International EPR (ESR) Society

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www.epr-newsletter.ethz.ch

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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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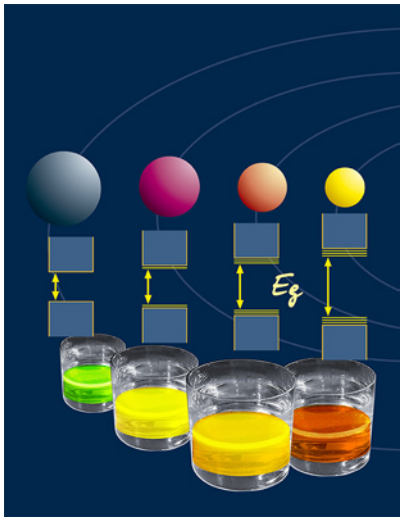

The cover picture shows four beakers with solutions of semiconductor nanoparticles with different diameters. The different colors are caused by the variation of the band gap as a result of the confinement effect. Research on ZnO nanoparticles carried out by Jan Schmidt, recipient of the 2006 Zavoisky Award, using high-frequency EPR and ENDOR spectroscopy has enabled for the first time the identification of shallow donors in these structures and measurement of the effect of size limitation on the electronic wave function. These results, the investigation of acceptors and donor-acceptor pairs and the observation of Dynamical Nuclear Polarization are presented in a series of publications in Phys. Rev. Lett. and Phys. Rev. between 2002 and 2008.

epr newsletter

The Publication of the International EPR (ESR) Society

volume 19 number 4 2010

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

BUSINESS

IES General Meeting 2010

The General Meeting of the International EPR/ESR will take place during the EPR2010, a Joint conference of the 14th in vivo EPR Spectroscopy & Imaging and the 11th International EPR Spin Trapping /Spin Labeling Meetings in San Juan, Puerto Rico, May 2–6, 2010. All IES members and Conference Attendees are welcome to participate.

Fellows of the IES 2010

James R. Norris

University of Chicago, Chicago, USA

Yuri D. Tsvetkov

Institute of Chemical Kinetics and Combustion, Russian Academy of Sciences, Novosibirsk, Russia

The IES Silver Medal for Physics/Materials Science 2010

Naresh S. Dalal

Florida State University, Tallahassee, USA

Detailed information will be given in a future issue of the EPR newsletter

Editorial

Dear colleagues,

Preparing to feature Anatole Abragam's 95th birthday in the "Five Years After" column, I have reread the Russian version of his memoires "Physicist, where have you been?" (1991, Nauka)* What a man, what a life story... I am sure those who read Anatole Abragam's memoires share with me this fascination and I can only envy those who are just opening his book and are anticipating the pleasure of diving into his life story full of intellectual vigor and adventures. Sometimes I wonder how come that the life of a scientist is so rarely featured in a movie. Numerous thrillers, crime, action, horror, fantasy... this is what we are doomed to. Back to these memoires: I had to prepare questions for his interview and I was afraid that no question could be good enough for him and I hoped that this was an opportunity to get answers to the questions that arose while reading his memoires. Yes, this second reading was as fascinating as the first one. I remember how glad I was to find out years ago that Anatole Abragam's favorite writer was Jules Renard: I share something with one of our greats! I emailed the questions to Anatole Abragam and he was very kind to respond promptly and in Russian, our native language. No, his answers are not in this newsletter. This was a very warm response in which he appreciated the overview of his achievements presented in the article of Maurice Goldman and Ionel Solomon and personal reminiscences articles by Keith McLauchlan and George Feher published in the *EPR newsletter* 14/4, pp. 8–10 and wished me success as editor of the *EPR newsletter*. A sweet photo of Anatole and Nina Abragam that illustrates the article of Denis Jerome, his first student, gives you an opportunity to look into Anatole Abragam's eyes and the article is a token of friendship lasting for nearly half of a century (p. 7). Good news: Erwin Hahn and Alex Pines are working on another article devoted to Anatole Abragam's 95th birthday to ▶

* The French version "De la physique avant toute chose" (1987, Odil Jacob); the English version "Time Reversal" (1989, Oxford Press).

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

be published in a forthcoming issue of the newsletter. Dear Anatole, we wish you good health for the years to come and please accept our deepest admiration!

I am grateful to Svetlana Sobolevskaya who helped me to contact Tengiz Sanadze. We had an extended article on his 75th birthday (14/4, p. 11) and he was very kind to contribute to the "Five Years After" column (p. 8). "Do not stop at difficulties!" – this message from an eighty-year-old wise man to the young researchers is inspiring for everybody. Our best wishes to you, batono Tengiz!

In the "Anniversaries" column we congratulate Uwe Eichhoff, a multitalented man (see also his article "Playing Flute", EPR newsletter 14/3, pp. 8–9) and a charming personality, on his 70th birthday (p. 5). As a special treat, he and Irina Stachinskaya (Moscow) play for you, dear readers, once again the first movement of the Sinfonia Concertante for 2 flutes and orchestra by Domenico Cimarosa, downloadable from www.eprnl.org/eichhoff.mp3. Dear Uwe, we wish that for the years to come you will give us an opportunity to enjoy the fascinating sound of your silver flute!

As to the twenty years of *Applied Magnetic Resonance* (p. 6), I cannot be an impartial judge since all these years I was involved in its activities. Let you come to your own opinion! In my feeling, to a great extent *Applied Magnetic Resonance* is a vivid manifestation of the complete dedication of Kev Salikhov, its Editor-in-Chief, to science. The Zavoisky Award [we heartily congratulate Daniella Goldfarb, the laureate 2009 (see below)] which was established on his initiative is on the same wavelength. The 20th Zavoisky Award celebration will take place this September in Kazan.

And you know what?! This issue of the *EPR newsletter* is not restricted only to the magic numbers, 95, 80, 70 and 20... turn the pages and your will find much more than that!

Laila Mosina

Awards

The Zavoisky Award 2009 to Daniella Goldfarb

The 2009 Zavoisky Award in Electron Paramagnetic Resonance Spectroscopy was awarded to Professor Daniella Goldfarb, Weizmann Institute of Science, Rehovot, Israel, in a ceremony marking her outstanding contribution to the pulsed high-field ENDOR methodology and applications to metalloproteins and zeolites.

The ceremony was preceded by the Annual Workshop "Modern Development of Magnetic Resonance", 28 September – 3 October 2009.

The Zavoisky Award was presented on October 2, 2009 in Kazan, the capital city of the Republic of Tatarstan. It was there that academician E. K. Zavoisky discovered EPR in 1944. The Zavoisky Award consists of a Diploma, a Medal and 1500 Euro.

The Zavoisky Award was established by the Zavoisky Physical-Technical Institute of the Russian Academy of Sciences with support from the Kazan State University, the Springer-Verlag Publishing House, the Republic of Tatarstan, the Tatarstan Academy of Sciences, the AMPERE Society and the International EPR Society. The Award Selection Committee consisted of well-known experts in EPR: Professors G. Feher (La Jolla), D. Gatteschi (Florence), H. M. McConnell (Stanford), K. A. McLauchlan (Oxford), K. Möbius (Berlin), and the Chairman, K. M. Salikhov (Kazan). The selection of the Awardee was made after consultations with the Advisory Award Committee which comprises Yu. N. Molin (Novosibirsk), and Yu. D. Tsvetkov (Novosibirsk).

Previous winners of the Zavoisky Award were: W. B. Mims (1991), B. Bleaney (1992), A. Schweiger (1993), J. R. Norris, Ya. S. Lebedev and K. Möbius (1994), J. S. Hyde (1995), G. Feher (1996), K. A. Valiev (1997), J. H. Freed (1998), J. H. van der Waals (1999), H. M. McConnell and Bruker Analytik GmbH (2000), K. A. McLauchlan (2001), W. Lubitz (2002), W. L. Hubbell (2003), K. M. Salikhov and D. Stehlik (2004), H. M. Swartz (2005), J. Schmidt (2006), Brian M. Hoffman (2007), and Michael Mehring (2008).

The selection of Professor Daniella Goldfarb was made from many nominations solicited from international experts in EPR.

The 2010 ISMAR Prize

Robert G. Griffin

Massachusetts Institute of Technology USA

The 2010 Bruker Prize

Ronald P. Mason

National Institute of Environmental Health Sciences – National Institutes of Health USA

The Award Ceremony was chaired by Professor K. M. Salikhov. He, as the Chairman of the Award Committee, announced the decision of the Zavoisky Award Committee. The presentation was made by Z. R. Valeeva, Deputy Prime-Minister of the Republic of Tatarstan. Professor D. K. Nurgaliev, Pro-Rector of the Kazan State University, Professor A. M. Mazgarov, President of the Tatarstan Academy of Sciences, Professor K. Möbius, member of the International Zavoisky Award Committee, and Prof. D. A. Gubaidullin, Deputy Chairman of the Presidium of the Kazan Scientific Center of the Russian Academy of Sciences, warmly congratulated the laureate. Letters of congratulations from Professor J. Freed, President of the International EPR Society, Professor B. H. Meier, President of the AMPERE Society, and Professor P. Callaghan, President of ISMAR, were handed to Professor Daniella Goldfarb.

D. Goldfarb gave her Zavoisky Award lecture in which she told about spins, molecules and magnets as studied by pulsed high-field EPR. A concert by a string quartet preceded and followed the ceremony. The event was concluded with a Banquet in honor of Professor Daniella Goldfarb and her outstanding contributions to EPR. During her stay in Kazan the laureate visited the museum of history of the Kazan State University and places of historical and cultural interest in Kazan.

The Organizing Committee owes special thanks to the Russian Academy of Sciences and Russian Foundation for Basic Research.

Notices of Meetings

EPR Workshop 2010: Cutting-Edge Biomedical EPR Methods

Milwaukee, Wisconsin, USA,
August 20–21, 2010

www.mcw.edu/EPRWorkshop2010.htm

The National Biomedical EPR Center at the Medical College of Wisconsin is funded by NIBIB to sponsor a workshop on advanced EPR methods once every five years. A workshop in this series will be held August 20–21, 2010. Attendees are expected to provide their own transportation to Milwaukee. Subjects to be covered in the workshop are listed below:

- Combined MRI/EPR studies on animal models of disease
- Nitroxides as therapeutic agents
- Novel microwave resonators
- Applications in biomedical research using multifrequency EPR
- Low frequency EPR
- Zero field and near zero field EPR
- Instrumental advances in high frequency EPR
- Novel distance determination methods and applications
- Microwave frequency swept EPR
- High pressure EPR.

Individuals interested in presenting their own work on one of these topics are invited to contact the Director of the EPR Center, Prof. James S. Hyde (aamadio@mcw.edu).

The 5th EF-EPR Summer School on Advanced EPR Spectroscopy

University of Constance, Konstanz, Germany,
September 5–12, 2010

cms.uni-konstanz.de/en/intra/epr-summer-school/home

Scope:

▪ introductory lectures on basics of magnetic resonance, density operator formalism, instrumentation, spin labeling, ENDOR, ELDOR, ESEEM, EPR imaging and ab initio computation of spin Hamiltonian parameters ▪ tutorials on density operator formalism, spectrum analysis, spectrum simulation, computation of spin Hamiltonian parameters and modeling of protein structure ▪ laboratory courses on basics of pulse EPR/advanced pulse EPR (Constance) and high-field EPR (Zurich) ▪ advanced lectures on DNP, multi-frequency EPR, applications to materials, metalloproteins, radical enzymes, and spin-labeled biomacromolecules ▪ auxiliary lectures on protein crystallography, optical techniques and general approaches in structural biology ▪ student poster session

Organization:

G. Jeschke, ETH Zürich (Switzerland)
e-mail: gunnar.jeschke@phys.chem.ethz.ch
M. Drescher, Universität Konstanz (Germany)
e-mail: malte.drescher@uni-konstanz.de

Rocky Mountain EPR Symposium

Snowmass, Colorado, USA,
August 1–5, 2010

www.rockychem.com/epr

Topics: Metalloproteins / Pulse Techniques / Protein Structure / Transient Radicals / Materials / In vivo EPR

Scientific committee: Glenn Millhauser (UC Santa Cruz) – *Chair*, Alex Angerhofer (Florida) – *Co-Chair*, Christoph Boehme (Utah), Gail Fanucci (Florida), Malcolm Forbes (North Carolina), Gary Gerfen (Albert Einstein College), Howard Halpern (Chicago), David Tierney (Ohio)

e-mail: info@rockychem.com

70th Birthday of Uwe Eichhoff

Dr. Uwe Eichhoff celebrated his 70th birthday on 26 December, 2009. In 1965, Uwe came to the Soviet Union to undergo training at the Physical Faculty of the Moscow State University. Having successfully defended his candidate's thesis on the NMR studies of molecular mobility, in 1970 he started with the development of NMR spectrometers at the company Bruker. In 1971, on the initiative of Prof. Laukien, President of Bruker, Uwe founded and headed the office of the company in the USSR. For over 30 years under Uwe Eichhoff's management of the Moscow Bruker office, a large number of EPR and NMR spectrometers, and other analytical Bruker equipment were installed in the institutions of the Academy of Sciences of the USSR (and then Russia), universities and industrial enterprises of the USSR, then Russia, and the CIS countries.

Uwe Eichhoff expended every effort in organizing the efficient service for analytical Bruker equipment especially given the spaciousness of the USSR, then Russia and CIS countries.

He contributed a lot to introducing the magnetic resonance tomography method medical practices in the USSR. The first four magnetic resonance tomographs installed in the USSR (Moscow, Kazan, Novosibirsk) were Bruker-built. To enable the fastest mastering of the magnetic resonance tomography method, Uwe organized numerous seminars, training courses, consultations for medical doctors and physicists both in the USSR and Western European countries. One should note that in the beginning of the nineties of the previous century there were no textbooks on magnetic resonance tomography in Russian and Uwe on behalf of Bruker arranged the Russian translation of the textbook of the European Society for Magnetic Resonance in Medicine in Biology, which for a long time was the only textbook in Russian.

Erudite in many areas, with the same brilliance, ease and enthusiasm Uwe tells the audience about Mozart or Bach, the history of the creation of a musical piece or the latest achievements in the field of analytical instrument making, biology, chemistry, physics, etc. Participants of many conference in Moscow, St.-Petersburg, Kazan, Azov, Tver', Kiev, Minsk, Tallinn had the pleasure of enjoying how well Uwe plays his silver flute.

Dr. Uwe Eichhoff's outstanding merits were highly evaluated by the Russian scientific community – he was elected honorable professor of the Moscow State University.

In his years of working in the Soviet Union and then Russia Uwe received sincere love and respect from all users of Bruker equipment. It should be emphasized that in many respects the Bruker success first in the USSR and then in Russia and CIS countries is due to the terrific charm, captivating glamour and inexhaustible energy of his spouse Barbara. One could affirm that having met Barbara once, for the rest of your life you remain under the unforgettable impression of her personality.

On this special occasion I would like to wish Dr. Uwe Eichhoff strong health, inexhaustible energy and creative success!

Nikolai V. Yakovlev,
General Director
Bruker Ltd. Moscow (Russia)

20 Years of *Applied Magnetic Resonance*

In the spring of 1988, when Perestroika in the Soviet Union was in full swing, I was elected the Director of the Zavoisky Physical-Technical Institute of the Academy of Sciences of the USSR (AS USSR) in Kazan. In my program for the election campaign I included an issue on starting an All-Union journal on magnetic resonance with the Editorial office in our institute. It seemed to me very surprising that Kazan, the Motherland of Electron Paramagnetic Resonance, does not host a specialized scientific journal. Soon after my election, an All-Union conference on applications of magnetic resonance was held in Kazan. In the Soviet Union time, the final meeting of a conference provided recommendations for the further development of the relevant field. In this case it was magnetic resonance. These recommendations were sent to the authorities of the AS USSR. At the final meeting of the above conference, I proposed to put on the list an issue on the necessity to publish a journal on magnetic resonance in the USSR. However, a colleague commented that it would hardly help, because the same recommendation from previous conferences failed. Nevertheless, I insisted that this issue be included. This idea was supported by Andrey S. Borovik-Romanov who at that time supervised the edition of journals by the AS USSR. On the basis of these recommendations, I prepared a proposal for the authorities of the AS about starting an All-Union journal on magnetic resonance. When I came to Moscow to the Department of journals of the AS, I was told that there were many proposals on starting All-Union journals in various fields and that it might take about five years to consider them. I was elected the Director for a five-year term and this long-term outlook did not suit me. Then I asked them how long the waiting list for considering proposals on international journals is. It appeared that there were none on the list and I could be the first. Initially, my idea of an international journal was to start a journal published by scientists from three countries: USSR, DDR and BRD. I had good colleagues in both German states and I thought this journal could help us to work and collaborate better. I shared my ideas with Hanns Fischer from the University of Zurich (Switzerland). After our discussions I realized it should not be a trilateral but a worldwide international journal. I decided to learn what leading scientists in the field of magnetic resonance thought of this idea. One of the first to be contacted was Richard Ernst (ETH Zurich, Switzerland). I called him in the USA where he was visiting at that time. He had some doubts because there were already several journals published on magnetic resonance. However, he supported the idea of a new journal and agreed to join its Advisory Board. Very soon the idea of starting a new journal got the support of the magnetic resonance community worldwide.

However, several domestic bureaucratic barriers had to be overcome. At that time the decision to issue a journal was made by a relavant Department of the Central Committee of the Communist Party of the Soviet Union. At the Annual General Meeting of the AS USSR I was told that this decision was to be made by a man in the presidium sitting next to the President of the AS USSR, Gury I. Marchuk. In the break between sessions I approached them, briefly formulated my proposal, and the fate of *Applied Magnetic Resonance* was decided. What remained was to prepare a substantiation report for the Ministry of Communications of the USSR that the journal should be issued in English.

Then technical problems of publishing the journal were solved as well. At the International Book Fair in Moscow (1989) I found a partner to publish and distribute the journal, Springer Wien New York and the pilot issue of Applied Magnetic Resonance was prepared in December 1989. In the period from 1990 till 1992, Applied Magnetic Resonance was printed in Kazan. Starting in 1993, we prepared films for printing and sent them to Springer in Wien. Starting in 2007, we supplied Springer with files for online and printing: *Applied Magnetic Resonance* became available online! As of June 1st 2009, the management of the journal is completely electronic via the Editorial Manager (http://

apmr.edmgr.com). Interesting AMR-related information can be found at http://www.authormapper.com/search.aspx?phr=journal:Applied%20Magnetic%20Resonance.

In my editor's introduction to the first issue of the journal, I gave two main considerations in its favor: "... The impressive variety of applications of magnetic resonance methods and their penetration into new fields of science and technology necessitates the appearance of a journal targeted at this so as to stimulate the expansion of applications of magnetic resonance. No less important is the fact that this journal will bridge the gap between scientists from East and West ..." Looking back, I can say that twenty years of *Applied Magnetic Resonance* demonstrate that it found its niche in the multitude of journals on magnetic resonance and the above considerations worked out. Regular articles and special issues on topical subjects reveal the vast majority of applications of magnetic resonance in various fields of science and technology. The support of the international scientific community made this endeavor a success. It is difficult or even impossible to name all the people who contributed a lot to the development of *Applied Magnetic Resonance*. Therefore I restrict myself to Ulrich Haeberlen (MPI für Medizinische Forschung, Heidelberg, Germany) and Keith R. Carduner (Ford Motor Company, Dearborn, MI, USA), first Associate Editors, and to Laila V. Mosina and Sergei M. Akhmin, my collaborators at the Editorial office of the journal in Kazan. I am most appreciative of the collaboration with the members of the Editorial and Advisory Boards of our journal and guest editors of special issues. You can easily find their names on the journal's website http://www.springer.com/springer-wiennewyork/physics/journal/723.

Looking forward, I anticipate the pleasure of meeting with all of you as authors, reviewers, editors and ... readers! Welcome to *Applied Magnetic Resonance*!

Kev M. Salikhov
Editor-in-Chief,
Applied Magnetic Resonance

Five years after

On Anatole Abragam's 95th birthday

On the Monday morning of October 1961 after having passed the protective though kind barrier of Mrs Houzé, the secretary, I found myself in the first office on the right on the ground floor of building H at Saclay facing the imposing figure of Professor Abragam. His first words were: "You have certainly inquired about me before coming and it is therefore fair that now I should do the same concerning you". When in August 2009 I reminded Anatole of this exchange, he thought it was perfectly in character.

To tell you the truth, there was no need to inquire about Anatole Abragam. In this particular case, the information reached me most naturally through a friend of mine, Marc Salesse, Head of the Metallurgy Department in Saclay at that time, who mentioned a group in Saclay particularly innovative in developing promising experiments in nuclear magnetic resonance.

Eventually, Anatole Abragam accepted me as a thesis student, which was rather daring on his part considering that I had followed a university course which offered none of the guarantees that go with the degrees of the Grandes Ecoles (Ecole Normale Supérieure or Ecole Polytechnique).

Thinking back on it, I believe that having himself escaped the normal and typically French course of Grandes Ecoles, he had an open mind devoid of prejudice, and this is how I became the first and one of the rare doctoral students of Anatole Abragam together with my friend Maurice Chapellier, also a student at the Orsay DEA in Physique des Solides.

The end of 1961 was the period when the Bible, i.e., "The Principles of Nuclear Magnetism" had just come out from Oxford Press and André Landesman was working on the French translation. To get me into the swing of things, Anatole entrusted me with the French manuscript, asking me to read it and pick out any possible errors. A difficult start for a youngster who knew nothing about resonance considering that it was several decades before the use of NMR for medical imaging.

Having reached chapter 3 without detecting a single error, I assumed that it would be so to the very end. Luckily, Ionel Solomon put me on a research subject related to the study of sodium nuclear resonance in low field enhanced by the Overhauser effect. This was an excellent introduction to experimental research which came to a conclusion a year later with the third cycle thesis and a foot in plaster after a mountaineering accident. This did not contribute to Anatole changing his mind about this leisure activity which he little appreciated though practiced by a number of his team members.

Once Anatole had successfully supported my application to the lowest possible position at CNRS (the regular way to enter CNRS!), Jacques Winter, who recently returned from Kittel's lab at Berkeley, took me in for a doctoral thesis. This thesis started with the as-

signment of equipping an empty room in the H building with a helium recovery line and building some electronics and spectrometers, the most efficient training according to Jean Combrisson, Anatole's faithful assistant. These three years of doctoral research took place in an outstandingly stimulating atmosphere to which the weekly lectures delivered by Anatole at Collége de France contributed.

The icing on the cake came during my last year with my meeting in Anatole's office with Professor Walter Kohn. Walter had just published with his colleague J. M. Luttinger the now famous article on the physics of semiconductors and my thesis dealt precisely with double resonance on the Mott transition in phosphorus-doped silicon.

This meeting with Walter Kohn was decisive for the rest of my career since we decided by common consent that I would go for a postdoctoral stay in his theory group at La Jolla in California. This decision was a rash one since after my thesis I had some vague notion of NMR and EPR but practically no theoretical knowledge except those acquired during the DEA at Orsay and it is with this light equipment that I joined one of the most famous theory group in the United States.

Later my choice to start a group in Orsay in Jacques Friedel's lab did not affect my relationship with Anatole who understood that it was only within the framework of the Solid State Physics Lab that the theoretical work accomplished with Walter Kohn and Maurice Rice could be put into practice.

Many are the memories of this long-lasting relationship with Anatole Abragam. They go as far back as the celebration of my thesis with both Anatole and Suzanne together with my parents at a dinner in Chez Garin, a famous restaurant in the Latin Quarter which Anatole often recalled when having our coffee break at Le café de la résonance after our lunch in common in Saclay. And later again, both Vered and myself were touched by Anatole's presence at our wedding and by his unforgettable present: the recording of Shakespeare's "The Taming of the Shrew".

We are happy to be able to keep up this relationship through our regular summer meetings with Nina on the terrace of our house in Jouy.

I still have the great pleasure to meet Anatole regularly and sometimes accompanied by Nina at the Académie des Sciences after I became a member in the late nineties.

Denis Jérome

Five years after

Tengiz Sanadze:
An Interview to the *EPR newsletter*

EPR newsletter: *Dear Professor Sanadze, on behalf of the readers of the EPR newsletter we congratulate you on your 80th birthday. We are most appreciative that you agreed to answer the questions of this interview. Why did you start towards your career in science and why was it EPR?*

This is an interesting question. As a child, I was going to become a physician. My parents encouraged my interest in medicine. I bought the relevant books and instruments... but soon I was carried away by chemistry. A Pioneer Palace was opened in a splendid building close to my school. I joined a chemistry circle headed by a remarkable teacher, Niko Dzhaparidze. We performed interesting experiments. This was so interesting that I equipped a chemical laboratory at home. I remember my first scientific report on the corrosion of metals which I delivered at a conference in the Pioneer Palace. This conference was particularly significant for me since well-known professors were present at this conference. In the chemical literature I often met mathematical symbols and integrals, which I did not know. Following the advice of my senior friend, I started to study higher mathematics with the textbook "Higher Mathematics" by M. Ya. Vygodskii and tried to solve all the exercises and problems. In 1946, when I studied in the 9th class, I read a book of H. D. Smyth on atomic energy. The book produced an indelible impression on me and I delivered a report on atomic energy at the school conference.

Thus, I was "doomed" to become a chemist. In 1948, when I graduated from school (11 classes) a prestigious Physical-Technical Faculty was opened at the Tbilisi University. Since I had a gold medal from school, I could enter any institute of higher education without exams but to enter this faculty I had to pass four exams: mathematics (written and oral) and physics (written and oral). I passed the exams successfully and in 1953 I finished this faculty specializing in nuclear physics. My degree work was in the field of cosmic rays: "Fluctuation of ionization losses of the fast particles". It was an experimental verification of the theoretical work of L. D. Landau. In the same year I took the postgraduate course at the Physics Faculty of the Tbilisi State University. At that time experimental physics at the university was not at a high level. I wanted to continue the work on my specialization at a scientific center in Moscow. This was not easily done but my tutor, Givi Khutsishvili, a student of Landau, helped me. He arranged with Alexander M. Prokhorov for me to join the Physical Institute of the USSR Academy of Sciences for six months as a postgraduate. Prokhorov himself was not concerned with EPR at that time but in his laboratory Alexander A. Manenkov, his postgraduate from Kazan, mastered the high-frequency techniques and was constructing a superheterodyne EPR spectrometer. It was meant that I would master the EPR techniques and continue scientific research at low temperatures at the Tbilisi University, where the cryogenic laboratory was under construction. My first task was to report at the seminar a review EPR article by B. Bleaney and K. W. H. Stevens published a

year earlier, in 1953. I successfully coped with this problem. Prokhorov proposed to me to stay in his laboratory until the end of my postgraduate course but I was pre-engaged to return to the university and continue the studies at the cryogenic laboratory there.

I would like to recall a detail from my "chemical" past. In the summer of 1955, returning home from Kazan where I participated in the All-Union EPR conference (EPR was just a ten-year kid!) I stayed for several days in the laboratory of A. M. Prokhorov. He recalled that I told him about my love for chemistry and proposed that I prepare lanthanum ethyl sulfate, which they could not synthesize. He said: "All the necessary reagents are available, our chemist is on vacation... let's try it!". I wrote the reaction scheme and prepared lanthanum ethyl sulfate easily. Then it was necessary to grow a single crystal of lanthanum ethyl sulfate with an admixture of 1% holmium. In three days in a small volume a single crystal of 1 cm^3 grew. Prokhorov was delighted: "Crystals grow as mushrooms in your hands!".

As you can see, I came to EPR accidentally, but I do not regret it since I lived a very interesting life in science.

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

Young scientists are the future of science... There were always a lot of graduate and undergraduate students in my laboratory. We often hosted young scientists from other cities and countries, e.g., from Germany and France. I often sent my students to Moscow and Kazan. My message to the young researchers – do not stop at difficulties!

What would you have done if given a different opportunity?

Please see above for the answer to this question.

Notices of Meetings

EPRBioDose2010
Mandelieu La Napoule, France, October 10–14, 2010
www.iss.infn.it/eprbiodose
e-mail: eprbiodose@iss.it

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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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
e-mail: sest2010@bio.phys.nagoya-u.ac.jp

Software

Adaptive Signal Averaging Technique that Reduces the Acquisition Time of Continuous Wave Magnetic Resonance Experiments

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Magnetic resonance is an immensely powerful analytical tool. However, the capabilities of the technique are frequently limited in measurements involving very small signal-to-noise ratios (SNRs). The standard approach in dealing with such low SNR measurements is signal averaging in which magnetic resonance traces are summed. The potential SNR gain in conventional signal averaging is, in principle, unlimited. However, since the enhancement in SNR scales with the square root of the number of repetitions, the practical ultimate limits are often less than adequate. A more sophisticated approach to enhancing SNR is possible, using a method we refer to as adaptive signal averaging.[1] Adaptive signal averaging can provide a very large improvement in the amount of time needed for signal averaging of continuous-wave magnetic resonance measurements. A particularly appealing aspect of the approach is that it is extremely inexpensive. It can provide a very low cost means to achieve a quite significant improvement in SNR and data acquisition time, entirely through software. Although the specific focus of our work has been to improve the sensitivity of continuous-wave EPR, the approach should be widely applicable to other analytical measurements in which the detection of a repeatable spectrum of almost any kind is obscured by noise.

There are many ways in which noise can be removed from data in addition to the standard methods of lock-in amplification and signal averaging used in just about all EPR spectrometers. One way is to post process the data using standard digital filters. The problem with this method is that the signal of interest will be attenuated along with the noise because both of these components contain the same frequency content after being passed through the low-pass filter of the lock-in amplifier. In other words, a reduction in noise comes at the cost of a reduction in signal. Another widely used method of noise reduction is a technique referred to as smoothing. There are many variants of smoothing algorithms that range from the simple form of sample averaging to the more computationally complex least squares polynomial fitting algorithms. The latter is actually a widely used implementation also known as the Savitzky-Golay filter. Smoothing filters work quite well when the frequency of the noise is higher than that of the frequency of the signal; this is not the case for many EPR measurements. These filters may become problematic when filtering narrower signals with low SNR, because the noise is included in the averaging or fitting process. As a result, the line shape and magnitude of the signal may become distorted, thereby biasing the output of the filter, and hence the average of the scans. (Note however that the Savitzky-Golay filter is better at preserving line shape but does not remove noise as well as conventional smoothing filters.) Since the details of the EPR spectrum, the line shapes, are quite important in magnetic resonance measurements, any systematic distortions are unacceptable. Another, much more promising, approach to noise removal is adaptive filtering. Adaptive filters are based upon adaptive linear prediction (ALP). ALP is widely used in signal processing for applications such as adaptive beam forming, equalization, and noise cancellation. A potentially serious limitation in this approach for magnetic resonance is that, to some extent, adaptive filters must "know" the shape of the signal so it will preserve the line shape while removing noise at the same time.

The ALP consists of a finite impulse response (FIR) filter w_n that is used to predict the desired signal $d(n)$ based upon a set of noisy observations $x(n)$. The estimate $d_{est}(n)$ is simply the inner product of the weight vector and the noisy input vector. It is adaptive in the sense that the algorithm adapts the weights of the FIR filter in such a manner so that the prediction of the desired signal is minimized with respect to some cost or error function. This estimate is then subtracted from the desired signal to form an instantaneous error $e(n)$ which is used in an algorithm to update the weights of the FIR predictor criterion. The block diagram of the ALP is illustrated in figure 1. The first question that comes to mind in a consideration of this method is what should be the desired signal in the ALP configuration with nothing known about the signal under observation? The answer to this question is the average of the scans. The next obvious question: how does one apply the average at the beginning of the experiment without any knowledge of this average? The answer to this comes with the explanation of the technique.

The measurement process starts as low signal to noise EPR measurements typically do, as each scan is completed, an average of all the scans is continually acquired. Once a weak signal becomes apparent in the average, the adaptive filter is switched on using the conventional average as the desired signal. (Note that even though the conventional average at this point is quite far from what is desired, it still contains useful information about the signal and nature of the noise of the scans.) This averaged signal may be utilized as the desired signal for the ALP. That is, this information is used by the ALP as an approximate guide for the filter to follow. Therefore, the filter allows the noise that it sees to pass, but it effectively reduces the variance of it. From that point, each of the remaining scans are filtered and averaged separately. At the same time, the conventional average is continually updated with the unfiltered scans and used in the ALP. Thus, the quality of the desired signal is continually improving and the effectiveness of the ALP is consequently also ▶

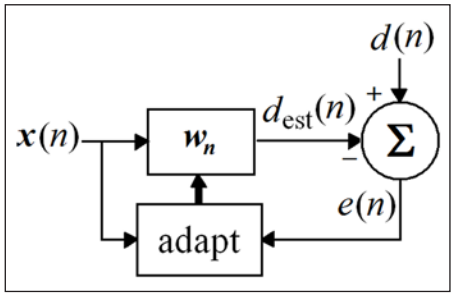

Figure 1: The block diagram of an adaptive linear predictor.

[1] Cochrane, C.J. / Lenahan, P.M.: Journal of Magnetic Resonance, 195 (1), p. 17–22, Nov 2008.

improving. Because the noise of the filtered scans is reduced, the noise in the filtered average will be reduced faster than that of the noise in the conventional average. Hence, the averaging process is essentially expedited via adaptive signal averaging (ASA). In order to achieve an additional twofold reduction in noise variance for an individual scan, the backward prediction of the desired signal is obtained and then averaged with the forward prediction of the desired signal. The forward prediction is another name for the technique of prediction that was previously discussed and the backward prediction is obtained exactly as the forward prediction was obtained but in the opposite direction of the noisy data set $x(n)$. In other words, instead of filtering the data set from left to right, the backward prediction is obtained by filtering from right to left. (Note that this cannot be performed in real time so it must be calculated at the end of each scan). This effectively produces two unique versions of the estimated spectrum because each point in the prediction is calculated based on a different finite set of data.

Many algorithms are used to update the weights in an adaptive linear predictor but the two most widely used are the Least Mean Squares (LMS) and the Recursive Least Squares (RLS) algorithms. (Note that the RLS algorithm is actually just the adaptive form of the widely used Least Squares (LS) algorithm. The difference between the two is that, as its name implies, the RLS algorithm reduces computation significantly by using the recursive nature of the correlation matrix and cross correlation vector.) These algorithms are advantageous because they are capable of tracking non-stationary signals and noise and don't require an estimate of the signal or noise statistics as more optimal filters do. The main benefit the RLS algorithm has over the LMS algorithm is that it has about an order of magnitude faster convergence time, though the LMS algorithm is known to have better tracking performance. One way to better the tracking performance of the RLS algorithm is to incorporate an exponentially weighing factor λ into the system which effectively allows for faster convergence. By doing this, the algorithm becomes the exponentially weighted RLS (EWRLS) algorithm. The parameter λ controls the memory of the system and is chosen to be less than 1. The EWRLS algorithm becomes the RLS algorithm when λ is chosen to be 1 which provides the system with infinite memory. The EWRLS algorithm attempts to minimize the exponentially weighted sum of squared errors cost function with respect to the taps of the FIR predictor as each new sample is presented to the system. Therefore, the taps of the predictor continually vary and are optimized so that the next prediction has minimal error.

Because the adaptive signal averager is composed of an FIR filter, its output will consist of a prediction error term. This error term varies slightly over the entire averaging process and is much less than the magnitude of the noise that is present on the original data. It is precisely this measured error term that determines the improvement in noise reduction of the filter. It can be shown that by using this technique, the reduction in noise is approximately equal to this prediction error variance divided by the number of scans in the filtered average. This factor is approximately 10 times smaller in our results than that of conventional signal averaging. In other words, this technique is capable of reducing the standard deviation of the noise by a factor of the square root of 10 in a single trace which implies a reduction in time by 10.

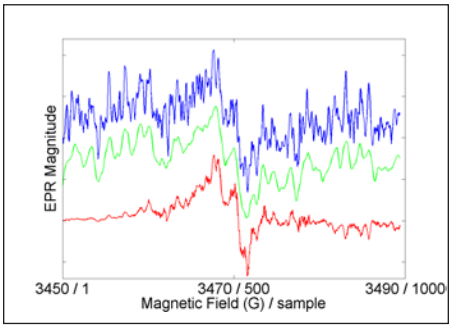

Figure 2: Comparison of an individual unfiltered EPR trace (blue/top) with that of its Savitzky-Golay filtered (green/middle) and EWRLS filtered (red/bottom) EPR equivalents.

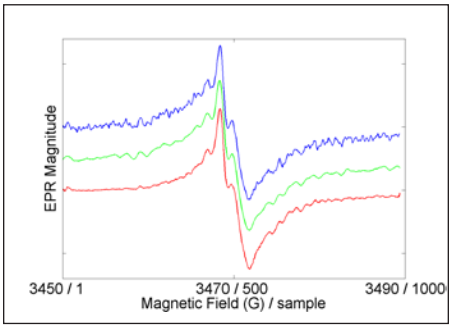

Figure 3: Comparison of the average of 100 unfiltered EPR scans (blue/top), the average of 100 Savitzky-Golay filtered scans (green/middle), and the average of 85 EWRLS filtered scans (red/bottom).

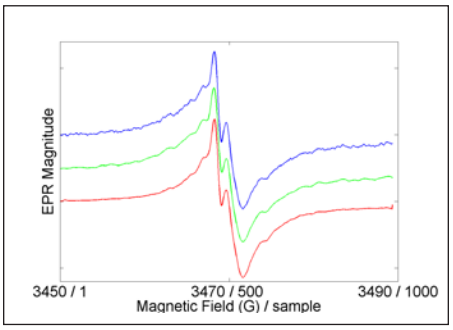

Figure 4: Comparison of the average of 1000 unfiltered EPR scans (blue/top), the average of 1000 Savitzky-Golay filtered scans (green/middle), and the average of 985 EWRLS filtered scans (red/bottom).

Results utilizing the ASA technique (using the EWRLS filter) on an EPR experiment were compared to that of conventional signal averaging and the widely used Savitzky-Golay filter. The parameters of the Savitzky-Golay filter were chosen to preserve the finer magnetic resonance structure observed in the spectrum and was applied from the start of the experiment. The EWRLS filter was configured with 8 taps, an exponential weighting factor of 0.985, and was applied after averaging 15 scans. Figure 2 compares an individual unfiltered EPR trace with that of its filtered equivalents. Note the significant improvement in noise reduction the ASA using the EWRLS algorithm has over both the unfiltered signal and that of the Savitzky-Golay filtered output. Figure 3 compares the averages of these signals after of 100 scans. Once again, note the improvement the EWRLS has over the conventional average and the Savitzky-Golay filtered average. The conventional average still contains a significant amount noise and the Savitzky-Golay filtered average actually gives the false impression of finer magnetic resonance structure due to its smoothing nature. The EWRLS filtered average in this case has almost converged in the same amount of time it took the conventional average to converge over the period of 1000 scans as seen in figure 4. After 1000 scans, the EWRLS average appears to be completely free of noise whereas the Savitzky-Golay filtered average also appears to be free of noise but once again, gives the false impression of finer magnetic resonance structure to the right of the average which is undesirable in these types of experiments.

In conclusion, we find the ASA to be an extremely useful and efficient approach for SNR enhancement in EPR. It is capable of reducing the standard deviation of the noise by a factor of at least the square root of 10 in a single trace and, as expected, the averaging time was reduced by a similar factor. In addition to magnetic resonance measurements, this filter approach could also be applied to any field where signal averaging is utilized.

7th European Federation of EPR groups Meeting and Closing Meeting of COST P15
Antwerp, Belgium, September 6–11, 2009

Every three years the European Federation of EPR Groups organizes a large EPR meeting. This year, the 7th edition of this meeting was held in Antwerp (Belgium) and combined with the Closing Meeting of COST P15. The COST P15 Action started in 2005 and will end officially in February 2010. It is an EU-funded Network of more than 65 EPR groups from 20 EU and associated countries and three partner groups outside of Europe (the EPR groups in Kazan (RU), Novosibirsk (RU) and Queensland (Australia)). COST P15 has been organizing a whole series of meetings and training schools, many of which have been reported in previous issues of the *EPR newsletter*. In addition, COST P15 has been funding approximately 80 so-called Short Term Scientific Meetings (STSMs). These STSMs allowed junior and senior scientists from the COST P15 participating groups to spend a minimum of five days up to three months in the lab of one of the other participants to set up new collaborations or perform experiments that would not be feasible in the home institute. In this way, COST P15 has triggered many new collaborations.

The combination of the EFEPR and COST P15 efforts led to a successful meeting in Antwerp with about 180 participants. The meeting was organized by Etienne Goovaerts and Sabine Van Doorslaer from the University of Antwerp and Freddy Callens and Henk Vrielinck from Ghent University. There were five plenary lectures, 24 invited lectures and 25 oral contributions. 105 posters were presented during two posters sessions. The scientific contributions covered many sub-fields of EPR. The plenary lectures were given by Thomas Prisner (Germany) *High-Frequency/High-field PELDOR and DNP*, Astrid Gräslund (Sweden) *The manganese-iron cofactor in chlamydial ribonucleotide reductase and related proteins*, Jack Freed (USA) *Protein Dynamics by multi-frequency ESR*, Klaus Lips (Germany) *Electrical detection of pulsed EPR in solar cells*, and M. Huber (The Netherlands) *EPR methods for structure determination in biological systems*.

During the meeting, the Segre Prize was awarded for the first time. Ulderico Segre (1946–2008) was an Italian scientist whose research activity greatly contributed to the advancement of theoretical and computational modeling applied to magnetic resonance spectroscopies. To honor his memory and on behalf of the Segre family, the Ulderico Segre Prize has been installed. The prize is awarded for an outstanding doctoral thesis discussing theoretical and computational models and advanced methodologies for magnetic resonance spectroscopies. The selection of the prize is done by the Italian national EPR Group, GIRSE, on behalf of the Segre family. This year's Segre Prize was awarded to two young scientists who wrote both an exceptional good PhD thesis: Reinout Declerck (Center of Molecular Modeling, Ghent University, Belgium) and Mirco Zerbetto (Dipartimento di Scienze Chimiche, University of Padova, Italy). They gave excellent lectures during the special Segre-Prize-dedicated session.

The RSC journal *Physical Chemistry Chemical Physics* (PCCP) sponsored three poster prizes at the meeting to stimulate young researchers in the field of EPR. They were won by the early stage researchers Marina Radoul (Weizmann Institute, Israel), Paul Cruickshank (St. Andrews, UK) and Maria Ezhevskaya (Antwerp, Belgium).

Furthermore, at the occasion of the EFEPR General Assembly, a new president of the European Federation of EPR Groups was chosen. This honor goes to Graham Smith (St. Andrews, UK). He succeeds Etienne Goovaerts who was the president for the past six years.

The scientific program was accompanied by a number of social events: (1) a welcome reception in the former hospital Elzenveld, a building dating from the early Middle Ages, situated in the center of Antwerp, (2) an excursion and guided tour in the city of Ghent during which local food could be tasted, (3) a Bruker-sponsored reception on the conference site, and (4) a conference dinner in the "Marble room" of the 19th century Zoo of Antwerp.

During the conference dinner, Wolfgang Lubitz gave a speech in honor of Giovanni Giacometti who celebrated his 80th birthday during the meeting (see also 19/3, p. 13). Giovanni Giacometti is very well known in the EPR community for his scientific achievements, but Wolfgang Lubitz highlighted also his important engagement in social projects, his love of literature and poems, and his kind personality in general. It was an emotional moment for Giovanni and his many collaborators, friends and former students present at the meeting. Furthermore, Klaus Möbius took the occasion to give a speech in honor of Wolfgang Lubitz' 60th birthday (July 2009) and to highlight his many achievements (see also 19/3, p. 15). In addition, the two founding fathers of EPR in Belgium were honored by the local organizers. These founding fathers are Etienne Boesman and Dirk Schoemaker. They were the first two scientists to receive a PhD in EPR in Belgium, more particularly at Ghent University. They performed their PhD work in the late 50s-early 60s and graduated virtually at the same time. Interestingly, the Varian EPR spectrometer they worked on was exhibited at the World Exhibition Expo 1958 in Brussels of which the Atomium is one of the most well-known reminders. After a postdoc time in the US, both Etienne Boesman and Dirk Schoemaker returned to

Flanders and funded the current EPR labs respectively in Ghent University and in the University of Antwerp.

From the many intensive discussions during the poster sessions and breaks, the many smiling faces and compliments at the end of the Meeting, we deduced that the meeting has been a success. The happy faces might of course also have been due to the beneficial effect that Belgian beers tend to have on one's spirit.

Sabine Van Doorslaer

The 2nd International Symposium "Dynamic Nuclear Polarization: Theory - Hardware - Applications - Radicals" Königstein, Germany, September 2–4, 2009

The Second International Symposium "Dynamic Nuclear Polarization: Theory - Hardware - Applications - Radicals" was organized from September 2–4, 2009 in Königstein, Germany, by T. Prisner, Goethe University Frankfurt. The venue of the meeting was the Conference Center Königstein (KTC), situated about 20 minutes from Frankfurt's city center. 145 Scientist from all over the world joint this symposium with 30 talks (16 invited) and 34 poster contributions.

Dynamic Nuclear Polarization has received in the last few years strongly increased attention by the EPR, NMR and microwave engineering community since recent papers demonstrated, that DNP strategies in conjunction with appropriate hardware can be used also at high magnetic fields to enhance the NMR sensitivity. The DNP symposium series started 2007 in Nottingham, UK. The intention of this symposium is to bring scientists of the EPR, NMR and microwave engineering communities which are currently working in the field of DNP together to discuss the fast progress in this new research area. The symposium covers all aspects of DNP, with sessions focusing on hardware development, the different DNP methodology strategies, theoretical considerations, in vitro applications of DNP in spectroscopy and imaging as well as in vivo applications in the medical MRI area.

This symposium was also the final meeting of the EU-Design Study Project: DNP for NMR in structural biology, coordinated by T. Prisner with 10 partners from Germany, Italy, France, Great Britain and Denmark and an associated member from USA. (www.bio-dnp.uni-frankfurt.de)

Talks at the symposium were given by:

S. Han, Santa Barbara, USA (Prospects of Overhauser dynamic nuclear polarization),

M. Bennati, Göttingen, Germany (^{1}H and ^{13}C dynamic nuclear polarisation with a two-field (0.35/14 T) shuttle spectrometer),

G. Parigi, Florence, Italy (Nuclear relaxometry helps designing systems for solution DNP),

D. Sezer, Frankfurt, Germany (Dynamic nuclear polarization studied with molecular dynamics simulations),

K. Münnemann, Mainz, Germany (^{13}C DNP of biomolecules dissolved in water and ^{1}H DNP studies of spin labeled polymers),

J. H. Ardenkjaer-Larsen, Hillerod, Denmark (^{13}C DNP with trityl biradicals),

T. Maly, Cambridge, USA (Optimized polarizing agents for high-field dynamic nuclear polarization),

M. H. Levitt, Southampton, UK (Insights from singlet NMR and prospects for DNP applications),

M. C. Cassidy, Cambridge, USA (Silicon nanoparticles as long-T_1 hyperpolarized magnetic resonance imaging agents),

M. Lerche, Malmö, Sweden (Imaging of elevated branched chain amino acid metabolism in tumors with hyperpolarized ^{13}C-ketoisocaproate),

A. Barnes, Boston, USA (Magic angle spinning DNP probe development: cryogenic sample exchange),

R. Griffin, Cambridge, USA (High frequency dynamic nuclear polarization in solids and liquids),

S. Glaser, Munich, Germany (Optimal control study of DNP),

W. Maas, Billerica, USA (Dynamic nuclear polarization at 263 GHz and applications to biological solids),

T. Fujiwara, Osaka, Japan (Dynamic nuclear polarization experiments at 14.1 T for solid-state NMR),

Graham Smith, St. Andrews, UK (Improved polarisation transfer using high power pulse techniques),

H.-M. Vieth, Berlin, Germany (Low field time-resolved dynamic nuclear polarization with field cycling and high resolution NMR detection),

B. Corzillus, Cambridge, USA (Time domain (pulsed) dynamic nuclear polarization at high magnetic field),

L. Frydmann, Rehovot, Israel (Indirectly-detected ultrafast 2D NMR of hyperpolarized solutions),

S. Vega, Rehovot, Israel (Determining factors defining spin diffusion during DNP experiments),

D. Kruk, Krakow, Poland (General and flexible theoretical approach to dynamic nuclear polarization),

W. Köckenberger, Nottingham, UK (Dissolution DNP NMR with an integrated system),

V. Denysenkov, Frankfurt, Germany (New double resonance structures for high field DNP in liquids),

M. Reese, Göttingen, Germany (A liquid-state shuttle DNP spectrometer for 600 MHz NMR: construction and results for ^{1}H and ^{13}C signal enhancement),

A. Kentgens, Nijmegen, The Netherlands (High-field dynamic nuclear polarization in a microfluidic context),

C. Hilty, College Station, Texas, USA, (Chemical and biochemical reactions studied by real-time DNP-NMR),

M. Pons, Barcelona, Spain (Exploring new radicals for solution DNP applications),

A. Comment, Lausanne, Switzerland (Dissolution DNP for in vivo brain studies),

D. Vigneron, San Francisco, USA (Towards clinical patient studies of hyperpolarized carbon-13 metabolic imaging),

K. Brindle, Cambridge, UK (Detecting tumour responses to treatment using hyperpolarized ^{13}C magnetic resonance spectroscopy and imaging),

The oral presentations at the symposium were all very high quality, exciting and new. New advancements in DNP agents, DNP techniques and methods, in theoretical interpretation and simulation of DNP experiments as well as applications in Chemistry, Physics, Biology and Medicine were presented. All the sessions of the symposium were very well attended. Different from meetings in more established fields, where participants are mostly interested in specific aspects, the new methodological and technical developments in the field of DNP were of general interest for all participants, as well as the applications of the method. Discussion was extensive and lively, not only after the talks but continuing in the breaks and after the sessions.

34 Posters were presented, some with very interesting, new and unpublished results. The feedback from many participants after the symposium was very positive. There was a general agreement that this symposium is highly beneficial for this particular research field, bringing together scientists working in such different research fields as ESR, NMR (spectroscopy, imaging, liquid as well as solid state), Microwave technology, Theory and applications ranging from material sciences to medical diseases. The atmosphere and size of the symposium stimulated new ideas, created new connections and collaborations.

Based on these positive responses it was decided that the symposium series should go on. The next (3d DNP Symposium) will be organised from 7–9 September in 2011 in Lausanne, Switzerland by the Swiss DNP Initiative (Prof. Dr. Ansermet and Prof. Dr. Bodenhausen).

Thomas Prisner

International Workshop Electron Magnetic Resonance of Strongly Correlated Spin Systems (EMRSCS2009)

Kobe, Japan, November 8–9, 2009

International Workshop Electron Magnetic Resonance of Strongly Correlated Spin Systems (EMRSCS2009) took place at the Takigawa Memorial Hall, Kobe Unversity, on November 8 and 9, 2009, prior to the 48th Annual Meeting of the Society of Electron Spin Science and Technology (SEST2009). It was organized by the Molecular Photoscience Research Center of Kobe University, and was cosponsored by SEST, the Physical Society of Japan and a Grant-in-Aid for Scientific Research on Priority Areas "Novel States of Matter Induced by Frustration". It was intended to cover the recent advances of high frequency and high field EMR and its applications to the study of strongly correlated spin systems, and it attracted 40 participants from 9 countries including 9 scientists from abroad.

The workshop started with a welcome address by the chairperson H. Ohta (Kobe, Japan) and with an introduction of the Molecular Photoscience Research Center by the director K. Tominaga (Kobe, Japan). The scientific program then started with an invited talk by G. Smith (St. Andrews, UK) who presented about his impressive development on high frequency pulsed EPR. The oral session on the first day was mainly focused on the developments of high frequency and high field EMR, and it was followed by the laboratory tour of Ohta's group in the research center, the poster session and the banquet. Participants enjoyed the Japanese sake, the food and the fantastic night view at the banquet. The oral session on the second day was mainly focused on the applications of high frequency and high field EMR to the strongly correlated spin systems. During the workshop we had 15 invited talks by Graham Smith (St. Andrews, UK), Czeslaw Rudowicz (Szczecin, Poland), Johan van Tol (NHMFL, USA), Hiroyuki Nojiri (Sendai, Japan), Sergey Demishev (Moscow, Russia), Oliver Portugall (Toulouse, France), Hitoshi Ohta (Kobe, Japan), Sergei Zvyagin (Dresden, Germany), Masayuki Hagiwara (Osaka, Japan), Olivier Cepas (Grenoble, France), Susumu Okubo (Kobe, Japan), Masaki Oshikawa (Kashiwa, Japan), Toru Sakai (Hyogo, Japan), Seiji Miyashita (Tokyo, Japan), and Toshikazu Nakamura (Okazaki, Japan). We also had 6 oral and 19 poster presentations. We think that the workshop was very stimulating for students and young researchers, who interacted with leading experts in the field during the workshop. I also would like to add that most of invited speakers and their accompanying persons from abroad enjoyed the hot spring in Arima spa, which is located on the other side of the Rokko mountain from the university, the day before the workshop. Finally I would like to thank all speakers, participants and members of organizing committee who led the workshop successful.

Hitoshi Ohta,
Chair of EMRSCS2009

Group photo of EMRSCS2009.

The 48th Annual Meeting of the Society of Electron Spin Science and Technology (SEST2009)

Kobe, Japan, November 8–9, 2009

The 48th Annual Meeting of the Society of Electron Spin Science and Technology (SEST2009) took place at the Centennial Hall and the Takigawa Memorial Hall, Kobe Unversity, during November 10 to 12, 2009 (see photo). The meeting is dedicated to all aspects of the research in the electron spin science and technology and its advanced detection and theory. This covers areas such as material science, the chemical reactions, the life science and the environmental concerns. It was organized by the SEST, and was cosponsored by the Chemical Society of Japan, the Physical Society of Japan, the Japan Society for Analytical Chemistry, the Pharmaceutical Society of Japan, Society for Free Radical Research Japan, the Society for ESR Applied Metrology and Molecular Photoscience Research Center of Kobe University. It attracted 210 participants (including 74 students) from eight countries, and we had two plenary lectures, five award lectures, eleven invited talks, 64 oral talks and 69 poster presentations.

Session at the Centennial Hall.

Following the opening address by the chairperson, the scientific session started by the plenary lectures entitled "Very high sensitivity, high bandwidth, orientation selective, DEER spectroscopy at 94GHz" by Dr. G. Smith and "What can we learn about spin systems from pulsed EPR and ENDOR at very high frequencies" by Dr. J. van Tol. After the plenary lectures two parallel sessions followed. They included Presentation Award talks by five candidates and the invited talk entitled "Development of a new high-field ESR technique using a cantilever" by Prof. E. Ohmichi (Kobe).

The second day started with the Mini-Symposium on "ESR Applied Metrology" organized by Prof. C. Yamanaka (Osaka) and Prof. M. Ohta (Niigata). There were five excellent presentations including "Contribution and Effects of ESR and Luminescence Studies to Archaeology" by Prof. T. Nagatomo (Nara) and two presentations by the organizers. The General Meeting of SEST was held in the afternoon. 63 SEST members (plus 84 presences by proxy) attended the General Meeting.

Sake ceremony at the Takigawa Memorial Hall.

The following researchers were elected as the SEST Council Members for 2010–2011 as the Office Bearers during the meeting.

President: Hitoshi Ohta
Vice-President: Kunihiko Tajima
Secretary: Akio Kawai
Treasurer: Kazuhiro Ichikawa
Publication and academic activities: Toshikazu Nakamura
Chief editor: Osamu Inanami
Other members: Kazunori Anzai, Hideo Utsumi, Tdaaki Ikoma, Takeji Takui, Motoko Asano, Aki Hirayama, Taiko Migita, ChihiroYamanaka
Auditors: Tokuko Watanabe, Mikinori Kuwabara

Then SEST Awards were presented to Prof. Y. Ajiro (Wako) and Prof. S. Tero-Kubota (Sendai), and Young Investigator Awards were presented to Dr. T. Kumada (Tokai), Prof. N. Mizuochi (Tsukuba) and Prof. M. Yamato (Fukuoka). Five award lectures followed, and the poster presentations took place at the Centennial Hall. In the evening we had a banquet at the Takigawa Memorial Hall and 148 participants gathered. Foreign guests must have enjoyed the sake ceremony at the banquet (see photo).

The final day started with the Mini-Symposium on "Spin analysis" organized by Prof. K. Tajima (Kyoto) and K. Ymada (Fukuoka). There were five excellent presentations including "Progress in fast CW-EPR imaging" by Prof. H. Hirata (Hokkaido) and two presentations by the organizers. In the afternoon final presentation by the chairperson closed the SEST2009.

Finally it was announced at the banquet that the next SEST2010 Annual Meeting will be organized by Prof. S. Kuroda (Nagoya) and held during November 11–13, 2010 at Nagoya University.

Hitoshi Ohta
Chair of SEST2009

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.
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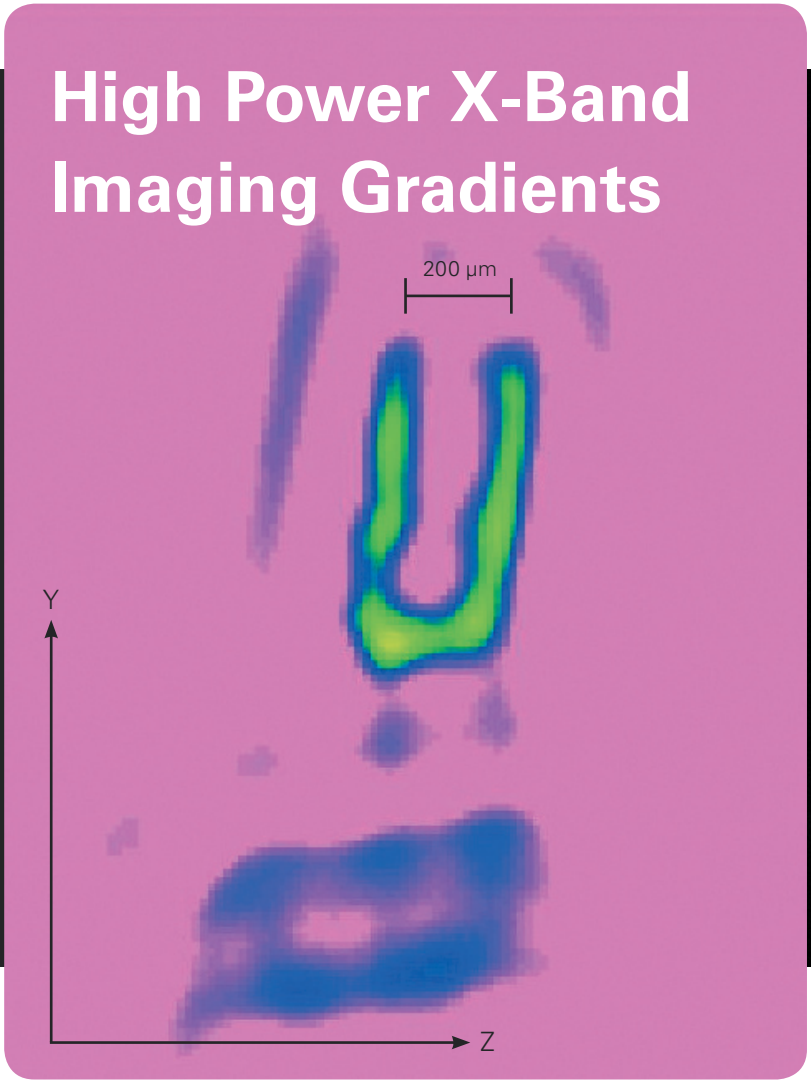

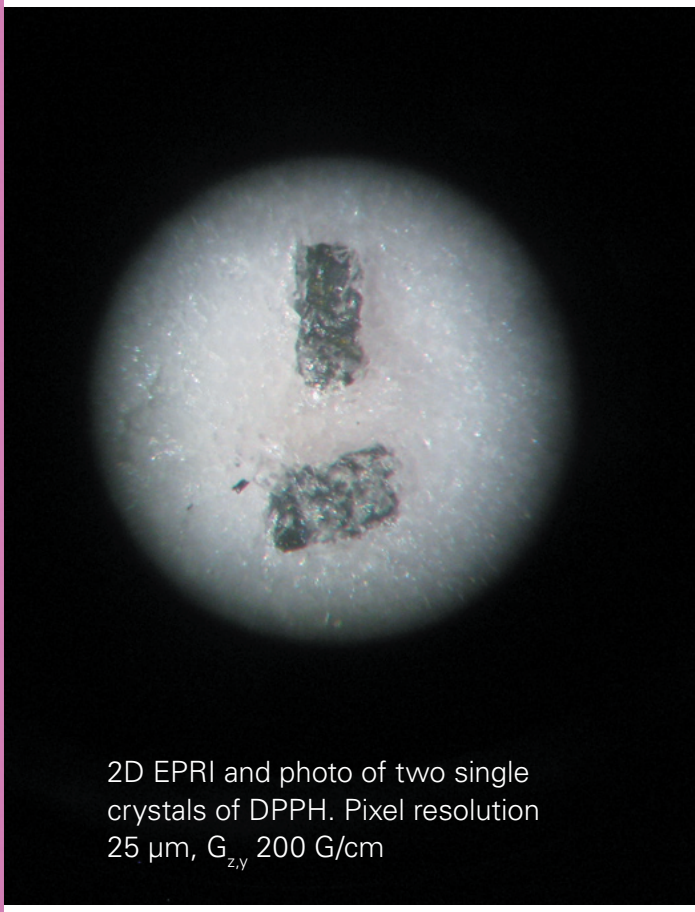

2D EPRI and photo of two single crystals of DPPH. Pixel resolution 25 µm, $G_{z,y}$ 200 G/cm

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