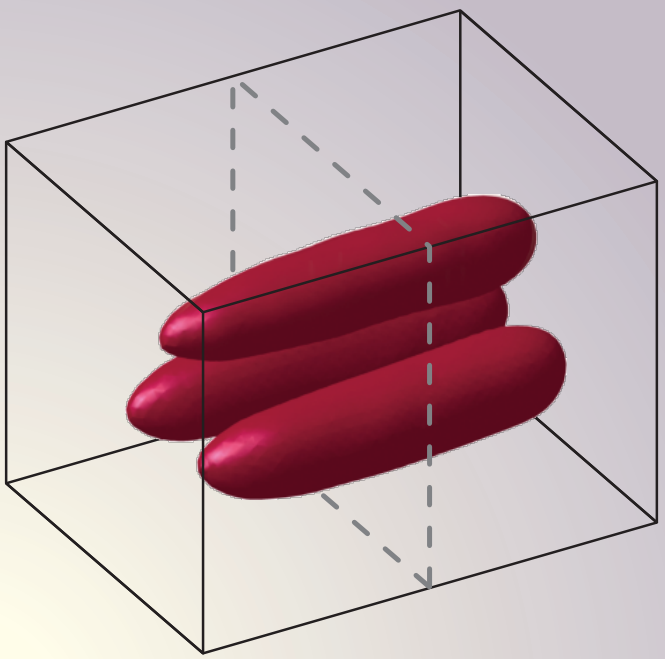
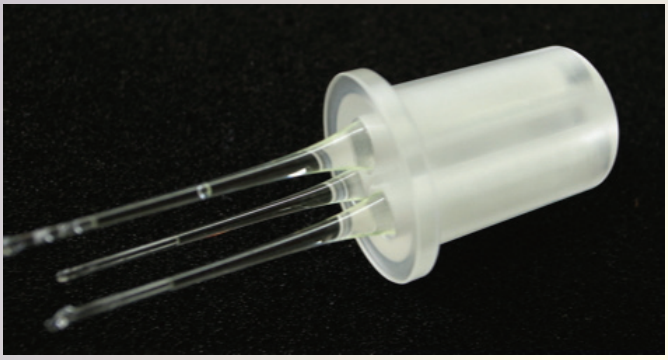
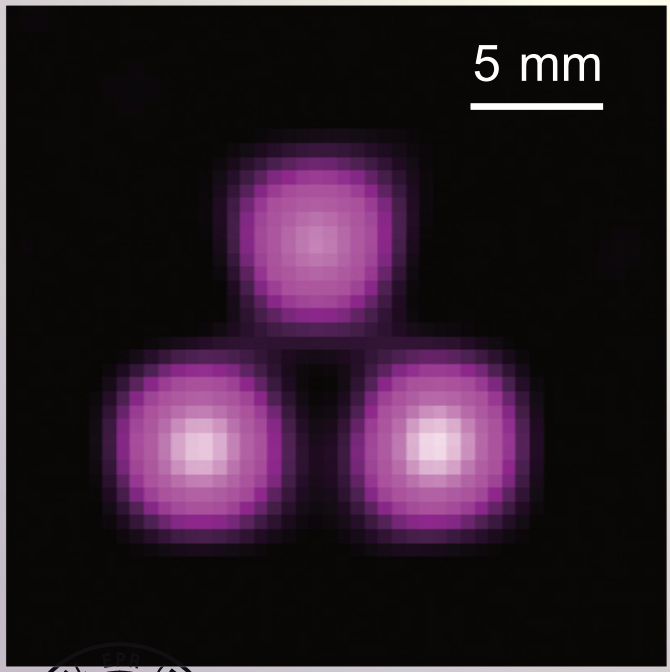
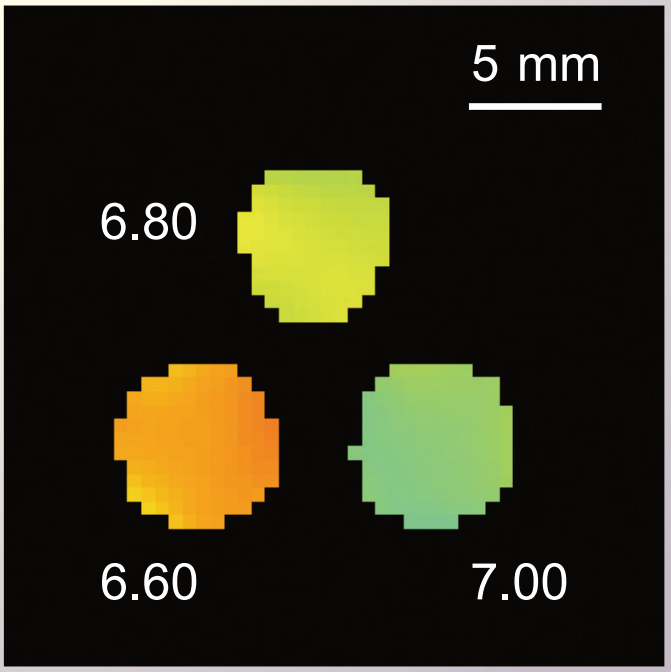
epr newsletter

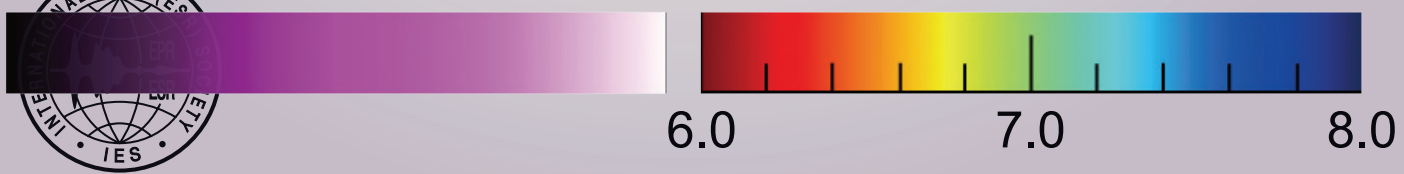
2024
volume 34 number 4











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

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

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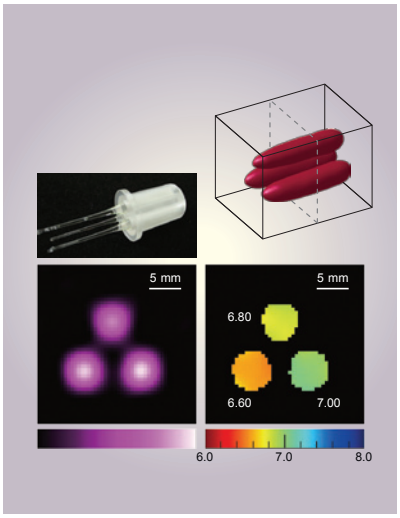


The cover picture illustrates aspects of the research of Hiroshi Hirata, recipient of the IES Medal for Instrumentation and Methods Development 2024. It shows three-dimensional pH mapping using 750-MHz continuous-wave EPR and pH-sensitive nitroxyl radicals (https://doi.org/10.1021/acs.analchem.8b03328). This method, providing the essential parameters to understand the tumor microenvironment, significantly impacts biomedical science in understanding the tumor microenvironment. In solid tumors, extracellular space becomes acidic due to the metabolic shift in cancer cells. Therefore, extracellular pH is a biomarker of malignancy of the tumors. This 3D pH mapping technique can be applied to biomedical problems involving extracellular pH response. A shift in extracellular pH was observed for mouse tumor models with an inhibitor of carbonic anhydrase IX (CA IX), which is a major player in pH homeostasis (https://doi.org/10.1021/acs.analchem.2c03194). Adapted with permission from D. A. Komarov et al., *Anal. Chem*. 2018, 90, 13938–13945. Copyright 2018 American Chemical Society.

epr newsletter

The Publication of the International EPR (ESR) Society

volume 34 number 4 2024

Are you interested to become a member of the International EPR (ESR) Society?
Please find the registration/information form for new/continuing members of the IES for individual members on this Web site: https://ieprs.org.

Editorial

Dear colleagues,

The last days of 2024 are fading away one by one. It seems that they are not only the days of the shortest daylight but also the shortest days physically: too little time and so many things to do till the end of the year! Lucky people in the Southern Hemisphere: our shortest day will be the same as their longest day. Sometimes I think it would have been even better to have an additional day in a leap year in December and not as February 29th.

Looking back, it is good to realize that our plans to celebrate the 80th anniversary of the EPR discovery in all issues of our publication in 2024 came true. A good balance was maintained between age and youth, experience and passion, to reflect the membership of the EPR Community. The highlight of our celebration was the IES Annual General Meeting for 2024 (p. 3–6), which was held at the 63rd Rocky Mountain Conference in Copper Mountain, Colorado, USA (pp. 12, 13). It is awesome how fruitful the year 2024 was for the Society. The development of all initiatives conceived and implemented by the Executives of the IES, whose never-ending creativity is remarkable, was accompanied by strong support from IES members.

A native of Kazan, I am excited and inspired that EPR was first observed in experiments carried out by the 36-year old Associate Professor of the Kazan State University Evgeny K. Zavoisky. Interestingly, 2024 also marks the 220th anniversary of Kazan University, which is also famous as the birthplace of non-Euclidian geometry and the place where the element Ruthenium was discovered.

The end of the year was hard for our magnetic resonance community. Sad news reached us that we lost several of our outstanding senior Members: Klaus Möbius, Alex Pines, Noboru Hirota, and Ralph Weber. This loss is very painful for us all, and we will pay due tribute to them in an In Memoriam Column of a forthcoming issue of the *EPR newsletter*. Our pain is hardly bearable and our grateful memory will keep them alive for the years to come.

It is my pleasure to thank all contributors to the *EPR newsletter*, Executives of the IES, and our wonderful team of Associate Editors: Candice Klug, Hitoshi Ohta, and Sabine Van Doorslaer, and our ingenious Technical Editor Sergei Akhmin. Special thanks go to editors of long-lived columns: John Pilbrow (EPR Newsletter Anecdotes), Candice Klug (New EPR Faculty), Wolfgang Lubitz (Guest of the Issue), and Stefan Stoll (Software). Generous support of all sponsors of the IES is gratefully appreciated.

Happy New Year 2025 with lots of challenging experiments, breakthrough theories, and fruitful discussions! And do not forget the motto of the *EPR newsletter*: "It is you who produce the news and we present it in our publication". Welcome to the *EPR newsletter* with your EPR-related material!

Laila Mosina

IES ANNUAL GENERAL MEETING 2024

Minutes of the Annual General Meeting of the International EPR/ESR Society for 2024 held at the 63rd Rocky Mountain Conference in Copper Mountain, Colorado, USA August 6, 2024*.

Agenda:

1. New IES Executives (2024 -2026)
2. 2024 IES Awards (Chemistry, Instrumentation, John Weil Young Investigator Award)
3 Support of EPR activities (Poster Prizes, Best Paper Awards, EPR schools)
4. IES online activities (including Twitter activities, IES Virtual EPR Meeting)
5. Report of *EPR newsletter* Editor (highlights: celebrating 80th anniversary of EPR)
6. Sponsors and Patrons of the IES 2024
7. Report of the Treasurer
8. Update on efforts to establish shared EPR database
9. Questions, Discussion, and Suggestions

1. IES Executives (2024-2026)

President: Marina Bennati, University of Gottingen, MPI for Multidisciplinary Sciences
Vice President Asia-Pacific: Sun Hee Kim, Korea Basic Science Institute Seoul
Vice President Americas: Sunil Saxena, University of Pittsburgh
Vice President Europe: John Morton, University College London
Secretary: Janet Lovett, University of St Andrews
Treasurer: Peter Qin, University of Southern California
Immediate Past President: Songi Han, Northwestern University
EPR newsletter Editor: Laila Mosina, Zavoisky Physical-Technical Institute

We thank the past Executive Officers (2021-2023)
President: Songi Han, Northwestern University
Vice President Asia-Pacific: Yasuhiro Kobori, Kobe University
Vice President Americas: Michael Wasielewski, Northwestern University
Vice President Europe: Maxie Roessler, Imperial College London
Secretary: Aharon Blank, Technion
Treasurer: Peter Qin, University of Southern California
Immediate Past President: Thomas Prisner, University of Frankfurt
EPR newsletter Editor: Laila Mosina, Zavoisky Physical-Technical Institute

2. 2024 IES Awards (Chemistry, Instrumentation, John Weil Young Investigator Award)

2024 IES Medal in Chemistry
Christiane R. Timmel, University of Oxford (presented at the 63rd Rocky Mountain Conference). For interview, see *EPR newsletter* 34/3, p. 7
2024 IES Medal in Instrumentation
Hiroshi Hirata, Hokkaido University (presented at the 63rd Rocky Mountain Conference). For interview, see *EPR newsletter* 34/3, pp. 7–9
2024 John Weil Young Investigator Award
Alexey Bogdanov, Weizmann Institute of Science (presented at EUROMAR 2024 Bilbao). For interview, see this issue, p. 7

Call for nominations of 2025 Medals:
IES Medal in Biology
IES Medal in Physics
IES Fellow
IES John Weil Young Investigator Award

3. Support of EPR activities (Poster Prizes, Best Paper Awards, EPR schools)

2024 Poster Prizes
2024 RSC EPR Warwick (Prize Chair: Songi Han)
- Angeliki Chatziathanasiou, Imperial College London "Evaluating the binding of inhibitors in the quinone binding site of photosynthetic complex I" (see *EPR newsletter*, 34/3, pp. 12, 13)
- Lucca Sielaff, MPI-NAT Göttingen "^{19}F ENDOR measurements using time domain ENDOR spectroscopy" (see *EPR newsletter*, 34/3, pp. 13, 14)

2024 EUROMAR Bilbao, (Prize Chair: Marina Bennati)
- Andrea Eggeling, ETH Zürich: "Quantum rotor EPR spectroscopy: Investigating the sensitivity of methyl rotors towards their local environment"
- Shiny Maity, University of California Santa Barbara: "Hydraulic activation of AsLOV2 revealed by EPR and NMR studies"

* Short report of the previous Minutes of the Annual General Meeting of the International EPR/ESR Society for 2023 held online at the 56th RSC Meeting in Leeds, March 26, 2023 (Held via Zoom) published in *EPR newsletter* 33/3 (2023) pp. 3–5.

From left to right: Songi Han, Christiane Timmel, and Marina Bennati.

From left to right: Marina Bennati and Hiroshi Hirata.

2024 RMC (Prize Chair: John Morton)

- Michal Kern, University of Stuttgart "Recent developments of the EPR-on-a-Chip technology, from proof of concept to real world applications" (see also IES Best Paper Award 2020/ 2021 to Michal Kern, *EPR newsletter* 32/1, pp. 4, 5)
- Karen Tsay, Northwestern University "Tracking of Tau Protein Nucleation and Elongation with a Mini-Prion Template"

2024 EF-EPR School in Marseille (Prize Chair: Aharon Blank)

- Ilenia Serra, CNRS "Insights into the [2Fe-2S] cluster of human mitoNEET and CISD2: Fe-S cluster stability investigated by EPR spectroscopy".
- Zichen Wang, University of Cambridge, UK "Continuous-wave electrically detected magnetic resonance unveils structural features of trap stats in disordered organic semiconductors".

No IES prizes at 2024 ICMRBS Seoul, Korea

2024 Spin Chemistry Meeting in Japan
(Prize Chair: Michael Wasielewski)

- Kousuke Higashi, Kobe University "Time-resolved EPR study of intramolecular exciton hopping contributing to triplet-triplet annihilation-based photon upconversion"
- Daniele Panariti, University of Padova "Generation and transfer of long-lived electron spin polarization in weakly-coupled peptide bridged chromophore-radical conjugates"

2024 Asia-Pacific Symposium in China (Prize Chair: Peter Qin)

- Akihiro Tateno, Saitama University "Reaction Control by AWG-RYDMR Using Frequency Chirp RF"
- Mikhail Kolokolov, International Tomography Center, Siberian Branch, Russian Academy of Siences. Poster #1: "Application of Electron Paramagnetic Resonance Spectroscopy as a Complementary Method in Studying the Structural Organization of Human Ribosome Complexes". Poster #2: "Dipolar Light-Induced EPR Spectroscopy of Fullerene and Porphyrin Symmetric Photoexcited Pairs"

Best Paper Awards 2023/2024

- Orit Nir-Arad, the University of Tel Aviv, Israel: The CW-EPR capabilities of a dual DNP/EPR spectrometer operating at 14 and 7 T, *J. Magn. Reson.* 2023. (see also IES Poster Awards 2022 and 2023 to Orit Nir-Arad, *EPR newsletter* 32/3-4, p. 19 and 34/1-2, pp. 25, 26)
- Sebastian Gorgon, University of Cambridge, UK: "Reversible spin-optical interface in luminescent organic radicals" *Nature*, 2023 (see also JEOL Prize 2023 and IES Poster Award 2023 to Sebastian Gorgon, *EPR newsletter* 34/1-2, pp. 19, 20)
- Arnau Bertran, University of Oxford, UK: "Direct comparison between Foerster resonance energy transfer and light-induced triplet-triplet electron resonance spectroscopy" *J. Am. Chem. Soc.* 2023

Support for Upcoming EPR Conferences and Schools

- 10th EFEPR Summer School 2025, Manchester UK, provisionally from August 31 to September 6, 2025.
- Annual Workshop "Advances in Electron Spin Resonance" September 13–15, 2024, Cornell University, USA

In future, there will be more travel stipends for students!

From left to right: Aharon Blank, Zichen Wang, Ilenia Serra, and Pierre Dorlet.

From left to right: Marina Bennati, Shiny Maity, Andrea Eggeling, and Janet Lovett.

4. IES online activities (incl. X activities, IES Virtual ERR Meeting)

New Social Media Officer for the IES

Christos Pliotas is affiliated with the Manchester Institute of Biotechnology. In Manchester, Christos will launch and lead the new BBSRC-funded BioEmPiRe Centre for Structural Biological EPR Spectroscopy, with a focus on integral membrane protein complexes, in late 2024.

X and Webpage:

Conferences. Abstract deadlines. Awards and prizes. Highlight people, especially students and postdocs to enhance their career. Like and follow new independent PI in EPR/ESR research. Relevant papers across EMR-relevant research activities.

IES Virtual EPR Meeting (IVEM)

All IVEM speakers get opportunity to be highlighted in the *EPR newsletter*. https://ieprs.org/on-line-activities

IVEM Coordinators

- Thomas Schmidt, NIH, USA
- Zhongyu Yang, North Dakota State University, USA
- Joseph McPeak, Helmholtz-Zentrum, Berlin, Germany
- Tomas Orlando, National High Magnetic Field Laboratory, Tallahassee, USA
- Yujie Zhao, University of St. Andrews, St. Andrews UK

IES Virtual EPR Meetings (IVEM) are broadcasted via X and Emails: IES X (https://X.com/EPR_ESR)

5. Report of the EPR newsletter Editor

Laila Mosina (highlights: celebrating 80th anniversary of the EPR discovery)

Since the IES AGM 2023 at 56th RSC Meeting in Leeds, we published two single issues 33/3 and 33/4, and a double one 34/1-2.

We hope you had a look at these issues on the IES website and got copies.

All issues of the *EPR newsletter* compose an encyclopedia of all aspects of the research carried out by the EPR community and diverse activities of our society and also show that there is life beyond EPR.

In our issues, you can find any EPR-related information you are interested in. You will also meet with pioneers of magnetic resonance and learn how great discoveries were made, get an insight into great minds who share their ideas with us, read success stories of laureates of different magnetic resonance awards, look into the eyes of newcomers who make their first steps in the career in science and be charmed by their enthusiasm and vigor, to name a few.

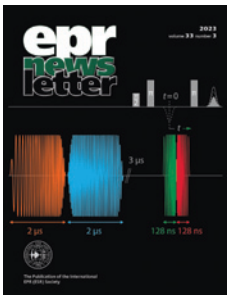
We, the *EPR newsletter* team, do our best to add new facets to our publication, which enriches the life of our community.

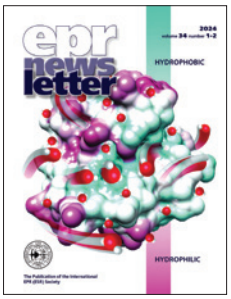
Welcome to the *EPR newsletter*!

Now we are working on the forthcoming issue 33/3.

To remind you, the columns of the newsletter that we present are:

- Editorial ▪ IES business ▪ Awards
- IES Young Investigator Award Revisited ▪ Another Passion
- Anniversaries ▪ EPR newsletter Anecdotes ▪ In Memoriam
- Present Meets Future ▪ Software ▪ Tips and Techniques
- Notices of Meetings ▪ Conference Reports ▪ New EPR Faculty
- New Books and Journals (including EPR Hot Science)
- Market Place ▪ Reader's Corner ▪ Guest of the Issue





Please feel free to submit YOUR material, dear colleagues!
You produce the news, and we present it in the *EPR newsletter*.

On behalf of the Editorial Board, I thank most heartily all contributors to the *EPR newsletter* with special thanks going to the CEOs of the IES and editors of the columns in the *EPR newsletter*: John Pilbrow, Candice Klug, Wolfgang Lubitz, Stefan Stoll, Sabine Van Doorslaer, and Sergei Akhmin, our Technical Editor.

I gratefully acknowledge collaboration with Associate Editors Candice Klug, Hitoshi Ohta, and Sabine Van Doorslaer.

6. Sponsors and Patrons of the IES 2024

Thank you, IES members!
Thank you, sponsors!
▪ ACERT ▪ Bruker BioSpin ▪ Bridge 12 ▪ CIQTEK
▪ Cryogenic ▪ GMW Associates ▪ JEOL ▪ L & M EPR Supplies
▪ Rotunda Scientific Technologies
▪ Springer / Applied Magn. Reson. ▪ Signals ▪ Virginia Diodes

7. Report of the Treasurer 2023–2024 (Peter Qin)

Beginning Balance (01/01/23	**$ 62,291.98**
Deposits:	
Membership	$ 2,673.34
Sponsor Contributions	$ 35,850.00
Misc	$ 0.00
TOTAL deposits:	$ 38,523.34
Expenditures:	
Internet Commerce & Merchant Services, Banking	$ 538.86
IES Community Support (Conferences, Training, Poster Awards)	$ 5,595.89
IES Operation (Web, Printing, Editorial)	$ 22,873.50
Misc (Registration, Postage, etc.)	$ 62.31
TOTAL expenditures:	$ 29,070.56
Balance as on 12/31/2023	**$ 71,744.76**

John Weil Fund
Established in 2010 in memory of Prof. John Weil by family, friends, and colleagues to support John Weil Young Investigator Award.

Starting Balance on 01/01/2023:	**$ 20,141.00**
Deposits:	$ 0.00
TOTAL deposits:	$ 0.00
Expenditures: 2023 YIA	$ 1,000.00
Banking Fee	$ 0.00
TOTAL expenditures:	$ 1,000.00
Ending Balance on 12/31/2023:	**$ 19,141.00**

Thank you, IES members, Thank you, sponsors: ACERT, Bruker BioSpin, Bridge 12, CIQTEK, GMW Associates, JEOL, L&M EPR Supplies, Rotunda Scientific Technologies, Springer / Appl. Magn. Reson., Signals, Virginia Diodes.

Discussion about how to teach EPR at undergraduate level and in high schools at the IES AGM2024 and after it will be summarized in a separate article by Gareth Eaton to be published in a forthcoming issue of the EPR newlsetter.

9. Questions, Discussion, and Suggestions

The IES Annual General Meeting 2024 was attended by all participants of the EPR Symposium at the RMC2024. Location and time of the AGM IES meeting 2025 will be decided soon.

Sun Hee Kim, IES Vice-President Asia-Pacific

Sun Hee Kim received her B.Sc. degree in Chemistry from SungKyunKwan University in Korea in 1995 and completed an M.Sc. in 1997. She then moved to the University of California, Davis to pursue her Ph.D., focusing on an EPR spectroscopic investigation of the water oxidation in Photosystem II under the guidance of Professor R. David Britt. After earning her doctorate, she joined Professor Brian Hoffman's group at Northwestern University as a postdoctoral researcher, studying oxygen activation enzymes, such as cytochrome P450, utilizing ENDOR spectroscopy.

Returning to Korea in 2009, Dr. Kim worked as a research professor at Ewha Womans University and has been a principal researcher at Korea Basic Science Institute since 2010. Her interest includes the effects of metal ions on amyloid fibrilization, catalytic reactions of bio and biomimetic enzymes, and quantum information science, employing various EPR spectroscopic methods. Dr. Kim's group has developed an operando EPR system for electrochemical reactions, a laser-interfaced time-resolved EPR for monitoring excited states of molecules, and rapid freeze quench equipment for trapping intermediates of catalytic reactions. Additionally, Dr. Kim holds adjunct professor positions in the Department of Chemistry at Ewha Womans University and Chung-Ang University in Korea.

Christos Pliotas, IES Social Media Officer

Christos Pliotas obtained a BSc in Physics at the University of Athens and an MSc and PhD at the University of Aberdeen. He did his postdoc at the University of St Andrews with James H. Naismith FRS (Structural Biology) and Olav Schiemann (EPR spectroscopy), working on the heptameric membrane ion channel MscS. Christos was subsequently awarded a Royal Society of Edinburgh Fellowship to become a principal investigator at the Biomedical Sciences Research Complex, University of St Andrews in 2016. He then moved to the Astbury Centre for Structural Molecular Biology, at the University of Leeds in October 2018, where he was an Assistant Professor in Integrative Membrane Biology, until May 2023. There, he focused his research on the application of pulse EPR (DEER, PELDOR) to the pentameric membrane ion channel MscL. During his time in Leeds he hosted the 56th Annual International Meeting of the ESR Spectroscopy Group of the Royal Society of Chemistry (RSC). Christos received a BBSRC New Investigator Award (2019) and the Sir Robin MacLellan Award for outstanding research funded by Tenovus (2022). As of June 2023 Christos and his lab have moved to the School of Biological Sciences, Faculty of Biology, Medicine and Health, at The University of Manchester, to take up a new post as a Reader in Structural Biological EPR Spectroscopy. As of January 2024, he has been elected as a Fellow of the Royal Society of Biology (FRSB) and is affiliated with the Manchester Institute of Biotechnology. In Manchester, Christos will launch and lead the new BBSRC-funded BioEmPiRe Centre for Structural Biological EPR Spectroscopy, with a focus on integral membrane protein complexes, in late 2024.

Pliotas Group Research Website Link: https://www.pliotasgroup.org

Interview with Doctor Alexey Bogdanov on the Occasion of His John Weil Young Investigator Award 2024

EPR newsletter: *Dear Doctor Bogdanov, on behalf of the readers of the EPR newsletter we congratulate you on your John Weil Young Investigator Award 2024. We are most appreciative that you agreed to answer the questions of this interview. Why did you start towards your career in science?*

My parents are university people. Shortly after I was born, my father started his PhD in mechanics, and my mother was teaching calculus to engineering students. We lived in a room within the Main Building of Lomonosov Moscow State University, the iconic skyscraper. I believe I absorbed the atmosphere from an early age.

Later on, my studies at the pre-university high school established by Andrey Kolmogorov in the 1960s for scientifically inclined children had a decisive impact on me. Among many brilliant chemistry teachers, Vyacheslav Zagorsky stood out. He would combine an unparalleled pedagogical style with active research, always presenting the simple textbook view of chemistry in a wider perspective of science and philosophy – but also with a hands-on approach, like during the pyrotechnics classes that we had. Having mentors like him played a major role in my decision to pursue an academic career from a young age.

Who introduced you into magnetic resonance?

I was introduced to magnetic resonance by two senior colleagues at Lomonosov Moscow State University: Vadim Timoshenko, who mentored me during one of my rotations, and Professor Andrey Vorobiev, who later became the advisor for both my MSc and PhD theses. Vadim is a genius when it comes to handling scientific instruments. By the time we met, he had already built his own EPR spectrometer, and over the years, he went on to construct numerous other contraptions, including an interference microscope, an X-ray CT scanner, and countless optical instruments – most of which he built from scratch.

Andrey Kh. Vorobiev introduced me to magnetic resonance in the broader context of molecular physics. He showed how spectroscopic techniques can reveal the behavior of molecules. One could not wish for a better advisor, nor imagine a better example, both personal and professional. Beyond his encyclopedic knowledge and wide-ranging research interests, spanning the kinetics of chemical reactions, optics, radical chemistry, soft matter physics and magnetic resonance, he is distinguished by his strong personality: impeccably honest, upright, and uncompromising when it comes to matters of truth. An utmost pleasure for him would be to learn about some new unexpected phenomenon to try and understand its origin, and then to devise experimental methods to test his hypotheses. Despite his critical and often fault-finding stance, he has an extraordinary ability to inspire optimism in scientific exploration and to encourage new ideas.

What is your current research topic?

I am currently working at the Weizmann Institute of Science, in the group of Professor Daniella Goldfarb. We look into new techniques in high-field pulsed EPR and explore the ways to apply them. My work specifically involves electron-nuclear double resonance, which is a really exciting field due to its borderline position between EPR and NMR, in the very heart of magnetic resonance. At Weizmann I work with two home-built high-field spectrometers that can be tailored for whatever experiment imagination may whisper, and this privilege gives a strong motivation to work hard, try different approaches and make good use of the instrument time.

Working with Daniella is an exceptional experience. She sets very high professional standards and keeps up to them; always several steps ahead, thinking of new experiments, ways to test hypotheses, or additional topics we could explore. Even more importantly, she is a genuinely warm-hearted person – truthful, radiant and always attentive to the needs of her students. I feel really fortunate to have such remarkable mentors.

What is your opinion about the future of EPR and the development of its applications and methods?

The great thing about EPR is that it integrates well into an unprecedented number of

different parts of natural sciences, standing on the crossroads of molecular chemistry, solid state physics, structural biology, geochemistry, polymer science, electrochemistry and many-many others, – whenever the main actor on stage is the electron, but also beyond these cases – thanks to spin labeling techniques. It would be overly ambitious to attempt to predict the development of such a broad and multifaceted area of research.

One clear prediction is that because EPR is operating on the edge of the state-of-the-art technological capabilities, developments in instrumentation will continue to contribute to the field in the coming years. That includes design of better cavities, powerful and robust high-frequency microwave elements, magnets with better characteristics, fast signal synthesizers, more powerful cryostats and so on. All these developments catalyze the development of applications, as well as the flow of ideas from NMR and coherent optics into EPR.

However, spectrometers themselves do not generate ideas. I believe that even the most widely used continuous wave X band EPR spectroscopy can reveal a great deal of new knowledge, if only we continue to be attentive to details and creative in designing experiments.

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

Let's share our knowledge and approaches and I bet we can do great science together!

Interview with Doctor Arnau Bertran Inglada on the Occasion of His IES Best Paper Award 2023/2024

EPR newsletter: *Dear Doctor Bertran Inglada, on behalf of the readers of the EPR newsletter we congratulate you on your IES Best Paper Award 2023/2024. We are most appreciative that you agreed to answer the questions of this interview. Why did you start towards your career in science?*

My interest in science arises from a relentless curiosity about the natural world. Initially captivated by the living wonders of the wild, my search for understanding led me to the smaller length scales of Molecular Biology, Chemistry and Physics. Through those I realised the potential that this understanding has to enable progress, and this became my second driving force to continue towards a career in scientific research.

Who introduced you into magnetic resonance?

During my undergraduate studies in Barcelona, I developed an interest in magnetism and light-matter interaction. Seeking a deeper understanding of the phenomena at the atomic level, I arrived in Oxford to start my DPhil with Dr. Alice Bowen and Prof. Christiane Timmel at the Centre for Advanced Electron Spin Resonance. From them and members of their groups, I learned from the very basics of magnetic resonance and laser spectroscopy to the intricacies of the combination of the two.

What are your main interests of work in magnetic resonance?

I am interested in the use of light-induced time-resolved ESR techniques to study organic semiconductors for solar energy applications, from photovoltaics to photocatalysts, and in their combination with other spectroscopic methods to obtain a complete picture of the photophysics and photochemistry of these materials.

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

Research in electron spin is growing fast in recent years. I think this is a very exciting period for young scientists to branch out from traditional fields of application of ESR and to explore new research areas where electron spin could play a role or provide additional information.

Alice Bowen:

Arnau began his scientific studies by completing a joint-honors in Chemistry and Physics at the University of Barcelona before undertaking a master program at Imperial College London in advanced materials. He began his doctoral studies at the University of Oxford in 2018, completing his studies in 2023, working as my first doctoral student on applications and method development of Electron Spin Resonance. He subsequently went on to complete a PDRA with Dr Claudia Tait also at the University of Oxford and is now a Scientist in the Laboratory for Molecular Engineering of Optoelectronic Nanomaterials in Lausanne, Switzerland.

During his doctorate Arnau demonstrated himself to be a highly independent and motivated student. What makes the achievements of his doctorate more impressive is that much of the research was conducted during the COVID lockdowns where only one person was allowed in the spectrometer room at once and most supervision had to occur via zoom! It was under these conditions that Arnau managed to optimize the Light Induced Triplet Triplet Resonance (LITTER) experiment for the results included in this paper and the quality of the EPR data in this work is a testament to his hard work and dedication.

No scientific work is conducted in complete isolation and this paper also represents an ongoing collaboration with Marilena di Valentin and Marta Di Zotti at the University of Padova. The optical FRET experiments, as companion to the LITTER results, were recorded at the University of Manchester by Jack Sawyer with Derren Heyes and Sam Hay.

I am very grateful to have had such a hard-working and talented student as my first doctoral student and to Christiane Timmel as Arnau's co-supervisor. I am sure that Arnau will go on to publish more excellent results in his current and future work in solar energy applications.

IES Poster Prize at the 2024 EUROMAR Congress Bilbao

Shiny Maity:

I am excited to share that I recently had the chance to present my latest findings on the Hydraulic Activation of AsLOV2 at the 20th European Magnetic Resonance Congress in Bilbao, Spain. Presenting to experts in the NMR and EPR fields was both inspiring and rewarding, as I received invaluable feedback and our discussions opened up exciting ideas for future collaborations.. A huge thank you to the organizing committee for making it such a welcoming and intellectually rich environment. I'm excited to bring these insights back to our project on AsLOV2 and continue building on what we've started.

Flavonoid proteins, like cryptochromes and phytochromes, are nature's versatile photoreceptors, involved in everything from plant development to human circadian rhythms. In my research, I focus on the light-responsive protein domain AsLOV2, which serves as a fascinating model for studying how light can drive mechanical processes. AsLOV2 converts blue light into mechanical action through its chromophore, flavin mononucleotide, triggering conformational changes that activate other proteins. It's incredible to think that light can fuel such a mechanical process, but the exact mechanism underlying this transformation remains elusive. In our recent study, we explore a new hypothesis: that the light-to-work transformation in AsLOV2 is actually mediated by the hydraulic action of water molecules, activated by light-induced electronic excitation. Our hypothesis is that light excitation not only prompts the hydration water to be expelled but also that the displacement itself drives the mechanical actuation of AsLOV2. Based on this theory, we propose that any event that induces the synchronized expulsion of structured hydration water, such as a sudden pressure jump, could activate AsLOV2, opening up exciting new avenues for understanding and harnessing this mechanism in other applications. To investigate, we used Overhauser Dynamic Nuclear Polarization (ODNP) to measure water dynamics close to spin-labeled AsLOV2 sites. Surprisingly, ODNP showed slower water dynamics in the lit state than in the dark, suggesting that structured water is expelled upon activation, leaving a denser hydration shell. The water that is selectively getting expelled first should be the water population with lower entropy, greater tetrahedrality, and lower density. To confirm the presence of these distinct water types, we needed direct experimental evidence, so we turned to ^{17}O NMR, which is sensitive to hydrogen bond angles and distances. To our surprise, preliminary results showed unique chemical shifts for bound versus wrap water, with wrap water displaying a downfield shift (near 1.3 ppm) in the dark state – a signal that reliably disappears in the lit state, consistent with the expulsion of wrap water. This close relationship between water behavior and AsLOV2 activation led us to wonder: could water movement be driving the protein's motion? To explore this, we collaborated with Dr. Janet Lovett's lab, using DEER to measure residue distances at both atmospheric pressure and 3 kBar in dark and lit states. Results showed that AsLOV2 favored a folded state under dark, low- pressure conditions. Increasing either pressure or light exposure increased the unfolded fraction, with the effects of pressure and light adding together – a strong indication that dehydration might be driving AsLOV2's unfolding. These observations support the idea that AsLOV2 functions as a hydraulic actuator, driven by the expulsion of structured hydration water. Advanced magnetic resonance techniques have given us a new perspective on a longstanding question: water itself can actively drive protein activation. By revealing distinct water populations with different structural and thermodynamic roles, we're beginning to understand how this water-mediated mechanism fuels AsLOV2's mechanical motion.

To wrap up, I want to express my heartfelt thanks to my advisor, Prof. Song-I Han, whose mentorship and encouragement have been a constant source of inspiration and motivation. I'm also incredibly grateful to my labmates for their camaraderie and support every step of the way—working alongside you all has made this journey both rewarding and fun. Special thanks to Dr. Janet E. Lovett and Prof. Mark Sherwin; your insights and collaboration have added so much depth to this project. I feel lucky to be part of such an amazing team and am excited to see where our work will take us next.

Songi Han:

Shiny Maity started her PhD research in the Fall of 2019. Shortly after, the COVID-19 lockdown in March 2020 changed our world. Shiny persevered through virtual meetings, virtual training, and Gedanken experiments – not an easy way to launch into graduate school. Nonetheless, the most exciting discovery might have emerged from a desperate attempt to do some experiments with home-built instruments that we had free access to, unlike the central facilities that were shut down, prohibiting Shiny from doing high-field electron paramagnetic resonance (EPR) and nuclear magnetic resonance (NMR) experiments. She decided to "look at" the hydration water properties around the AsLOV2 upon light activation, "just for fun", and discovered that the photoreceptor is squeezing out significant populations of water upon light activation – the hydraulic pump hypothesis was born! Shiny then spent 3 more years on validating this hypothesis that water is the master and the light only a switch. In collaboration with the Sherwin and Lovett group Shiny could show that light can hence be replaced with a pressure switch, both of which squeeze out water from AsLOV2 for a mechanical punch action. This work is currently in preparation for a manuscript and earned her the well-deserved IES Poster prize.

IES Poster Prize at the 2024 EUROMAR Congress Bilbao

Andrea Eggeling:

Site-directed spin labelling is a powerful technique to investigate the conformations and dynamics of biomolecules using electron paramagnetic resonance (EPR) spectroscopy. Typical spin-labels are based on nitroxides that contain geminal methyl groups to shield and stabilize the unpaired electron. The low-temperature Hahn echo decay signal of such nitroxides contains two contributions on different time scales. The slower contribution arises from nuclear pair electron spin echo envelope modulation (ESEEM) [1], whereas methyl tunneling causes ESEEM on a faster time scale [2]. Since the electron spin decoherence determines the accessible distance range for double electron-electron resonance (DEER) experiments, it is of central importance to investigate the methyl-tunneling related contribution in the Hahn echo decay signal.

Rotation of a methyl group gives rise to a threefold potential characterized by the rotation barrier, which is sensitive to the local environment of the methyl group. At ambient temperatures, classical methyl group rotation by hopping over the rotation barrier is responsible for the exchange process of the methyl group proton. However, at low temperature, the rotational motion is frozen and tunneling of the methyl rotor through the potential wells becomes the dominant proton exchange process of the methyl rotor. Wavefunction overlap between the different localized states of the quantum rotor leads to a splitting of degenerate ro-librational energy levels by the tunneling frequency [3]. For higher rotation barriers the tunneling frequency becomes smaller, due to a smaller wavefunction overlap. Low-temperature EPR measurements, especially for structure elucidation of proteins, are carried out in a glassy matrix for which a distribution of rotation barriers must be considered due to different local environments in the near-range surrounding [4].

We developed the methyl quantum rotor (MQR) model, that allows to quantitatively extract the underlying rotation barrier distribution from experimental low-temperature ESEEM signals of commonly used nitroxides where methyl rotors are coupled to an electron spin [4]. In a proof-of-principle study we validated the use of the MQR model by proving characteristic properties of methyl tunneling like its magnetic field and matrix deuteration independence as well as its typical temperature behaviour [4]. Moreover, we investigated rotational tunneling beyond methyl groups in nitroxides by comparing the tunneling ESEEM contribution originating from rotors of different alkyl substituents. Geminal ethyl groups in nitroxides exhibit a larger tunneling ESEEM modulation depth than the analogous methyl groups due to better matching between the tunneling frequency and the differences of the methyl rotor proton hyperfine couplings [5]. Additionally, we found that ethyl groups in nitroxides experience less local hindrance manifesting in a lower rotation barrier distribution than methyl groups due to their increased conformational flexibility [5]. Lastly, the influence of the nitroxide backbone and the matrix composition was examined in a systematic study of three commonly used nitroxide spin-labels in biologically relevant matrices. We found that the matrix composition only minorly influences the tunneling behaviour of geminal methyl groups, whereas the ring structure of the spin-label has a significant impact on the rotation barrier distribution. The evaluated tunneling behaviour could be rationalized by the accessible ring conformations of the pyrroline-, pyrrolidine- and piperidine-based nitroxide backbone.

In general, our studies showcased that the tunneling ESEEM contribution in the Hahn echo decay signal contains valuable local environment information in terms of the underlying rotation barrier distribution. Therefore, we believe that methyl tunneling ESEEM is an interesting phenomenon for applications beyond relaxation studies. Methyl groups coupled to an electron spin, like it the case for the commonly used nitroxide spin-labels, could serve as local environment probes, since their rotation barrier is sensitive to near-range hindering interactions. In combination with site- directed spin-labelling of proteins, quantum-rotor EPR spectroscopy could provide access to new exciting types of short-range structural information complementary to other EPR techniques.

1. Jeschke, *JMRO*, **2023**, 14–15, 100094
2. Soetbeer et al., *Phys. Chem. Chem. Phys.*, **2021**, 23, 21664–21676
3. Dimeo, *Am. J. Phys.*, **2003**, 71, 885
4. Eggeling et al., *Phys. Chem. Chem. Phys.*, **2023**, 25, 11145
5. Eggeling et al., *Phys. Chem. Chem. Phys.*, **2024**, 26, 15240

Gunnar Jeschke:

Andrea Eggeling first visited my group in in spring of 2019 for a research project on characterization of a Gd(III) spin label. I also noticed her in the lecture course on measurement technology and signal processing. In 2020, she joined my group for a master thesis on non-uniform sampling in pulsed dipolar spectroscopy. Since January 2021, she worked on her doctoral thesis on EPR characterization of methyl quantum rotor systems.

Quantum rotors, such as methyl groups, defy classical thinking. They do not actually rotate, yet the protons exchange their places. They do so by tunneling through an energy barrier that is otherwise too high. Sometimes Andrea reminds me of a quantum rotor. I do not see how she is getting over the barrier, but when she talks about her results, I see that she has passed it. This must be the result of hard work rather than tunneling, yet she appears calm.

Before Andrea started her thesis, we had attributed initial fast decay of the Hahn echo of nitroxide spin labels to methyl tunneling. We expected a distribution of the tunnel splitting in glassy frozen solution. Andrea managed to quantify such distributions. In this, she profited from her previous work on signal processing. She took great care in characterizing uncertainty of her results and in checking which parameters influenced the outcome. About midway in Andrea's thesis project, the Eatons contacted me. They had puzzling echo decay data for nitroxides with longer alkyl groups and suspected that quantum-rotor behavior might be the reason. In the resulting wonderful collaboration, my own task was just to read the e-mails that Andrea exchanged with Sandra Eaton. Explaining such a complex story on a poster or in 600 words, as in this Newsletter, is difficult. Obviously, Andrea can do this, too.

RSC INTEREST GROUP
ESR SPECTROSCOPY

The 57th Annual International Meeting of the RSC ESR Group
April 2024, University of Warwick, UK

The 2024 meeting of the ESR Spectroscopy Group of the Royal Society of Chemistry made a welcome return to the University of Warwick for our third meeting there, following successful events in 2004 and 2013. Much has changed since our previous visit, with the meeting held in the new £57.5m Faculty of Arts Building opened in December 2021. Those who ventured over to the Millburn House Magnetic Resonance Centre may have seen that our cousins in NMR have reached L-band, with installation of the UK's first 1 GHz solid-state NMR, also opened in 2021 and soon to be joined by a 1.2 GHz system. With our previous host, Prof. Mark Newton, currently heading the physics department, the organisational baton passed to the eminently capable hands of Dr Ben Breeze. Ben is manager of the Spectroscopy Research Technology Platform which provides both EPR and optical spectroscopy facilities to university and external users (UK postgraduate students may be eligible for free use of these facilities, see https://warwick.ac.uk/fac/sci/wasc/seedcorn for details).

The event began with morning sessions themed around the group's first Lifetime Achievement Award in Spin Chemistry, which was presented to Prof. Jim Norris to recognise his pioneering work in time resolved EPR, optical spectroscopy and magnetic field effect studies. The proceedings kicked off with a workshop led by Dr Claudia Tait exploring use of EasySpin for simulation of Spin Polarised systems. Following a short break the laudation for the award was given by Prof. Stefan Weber, and the award presented by ESR Group Chair Prof. Christiane Timmel. To demonstrate the ongoing applications following in Jim's footsteps we were then treated to two lectures by junior researchers, Dr Jeannine Grüne presenting work on quintet and triplet generation in intramolecular singlet fission and Dr Sabine Richert the optimisation of spin coherence times in photogenerated quartet states. While not formally part of the prize session the theme of transient EPR continued for much of the remaining talks of the day, with topics including conformation dynamics of exciton pairs, triplet delocalization in porphyrin ions, quartet states in luminescent radicals and photo switching in Gadolinium complexes.

In addition to the special session for the new lifetime achievement award, the meeting included a number of lectures associated with various longer running industry sponsored prizes. Following from the JEOL sponsored drinks reception on Monday evening, the Tuesday afternoon prize lecture sessions included eight excellent student talks in the JEOL student medal competition. The standard of the presentations was again high, as always making for a challenging time for the judges, with the eventual winner Jörg Fischer for his talk "*Advancing operando CW EPR spectroscopy: modulated excitation spectroscopy for enhanced understanding of catalysts.*" Runner-up prizes went to Janko Hergenhahn and Yasmin Ben-Ishay, for lectures on "*Electron and nuclear spin interactions in porphyrin radical anions*" and "*Revealing the dual behaviour of PpiB in solution and in cells by EPR spectroscopy*", respectively. We were pleased to welcome Dr Iain Day from JEOL to the meeting for the first time to make the award presentations following the conference banquet, and we thank Iain and the JEOL team for their continued support of this important prize which has been awarded annually at the meeting since 1997.

The second major student prize presented at the meeting was the Bruker ESR Thesis Prize, this year awarded to Dr Fabian Hecker for his thesis "*^{17}O hyperfine spectroscopy to investigate water binding to organic radicals*", completed at Max Planck Institute for Multidisciplinary Sciences Göttingen under the supervision of Prof. Marina Bennati. We were delighted this year to mark the 10th anniversary of this prize, with Fabian's outstanding lecture on his thesis work followed by a Bruker sponsored evening drinks reception and a celebratory cake to mark this milestone.

This year the committee took the decision to compress the conference programme into three days, which enabled the meeting to be followed for the first time by a Bruker ESR users meeting on Thursday at the nearby Bruker UK site. Despite the shorter programme, we were still treated to plenary lectures by Prof. Yasuhiro Kobori "*Manipulating anisotropic conformation dynamics of exciton pairs: transient and pulse EPR analyses*", Prof. Chris Kay "*From CIDEP to MASERs: a dielectric journey*", Prof. Lorenzo Sorace "*Molecular spins for quantum technologies: from qubits to qudits and qugates*" and Prof. Sandra Eaton "*Electron spin relaxation – experimental data and modeling*", along with invited talks by Dr Pierre Dorlet "*Copper resistance in bacteria using a green cupredoxin*", Dr Daniel Klose "*Combining spectroscopy and quantum chemistry for structural information on heterogeneous catalysts*", Dr Janet Lovett "*Tales from the bio-EPR theme park*" and Dr Emma Richards "*Long-lived, ambient Cr(III)-based near-IR emission, and donor-acceptor dyads for upconversion technologies*", along with 20 contributed talks. The scientific programme concluded with the Bruker Prize Lecture. Prof. Songi Han gave a tour-de-force account of her life's work in the world of magnetic resonance from DNP to EPR with a strong focus on the science (and beauty) of water. It was a most impressive and joyous conclusion to three days of outstanding research and scientific discussion.

At the following banquet, we enjoyed our food and drink, celebrated our prize winners with plenty of applause and cheers, and announced the winners of our hotly contested Poster Prizes which went to Lucca Sielaff "*^{19}F-ENDOR measurements using time-domain ENDOR*" (IES Winner), Angeliki Chatziathanasiou "*Evaluating the binding of inhibitors in the quinone binding site of photosynthetic complex I*" (IES sponsored runner-up), and Jack Palmer "*Modelling the time evolution of charge-separated states in organic photovoltaics*" (RSC sponsored runner-up). In the after dinner speech, we learned about the history of Warwick, Kenilworth, Coventry and, oddly, potatoes – but most of all we

Award of the 2024 Bruker Prize to Prof. Songi Han (centre), with RSC ESR Chair Prof. Christiane Timmel (right) and Dr Frédéric Jaspard of Bruker (left).

thanked our Conference Organisers, in particular Dr Ben Breeze for his tireless work to make our 2024 conference the success it was. It was a fitting end to a conference that gave us only appetite for more. We are therefore already looking forward to seeing you all back in London in 2025 when we will celebrate not only another 12 months' achievements in EPR but also the 40th Bruker Lecture! We once again thank our attendees who make the meeting so vibrant and our sponsors who make the meeting possible, and can't wait to welcome you at the RSC ESR conference in April next year.

2025 Meeting

Our next meeting will take place in London between 6th and 10th April 2025, and is organised by Prof. John Morton and Dr Jon Breeze of UCL. Please see http://www.esr-group.org/conferences/2025-conference-london for further information and join the RSC-ESR-GROUP@JISCMAIL.AC.UK mail list or follow @RSC_ESR on X to be notified when registration and abstract submission opens.

Dr Chris Wedge,
RSC ESR Group Secretary

The 45th EPR Symposium at the 63rd Annual Rocky Mountain Conference on Magnetic Resonance

August 4–8, 2024, Copper Mountain, CO, USA

This year's EPR and Solid-State NMR (SSNMR) Symposia were held jointly from August 4th to 8th at the 63rd Annual Rocky Mountain Conference on Magnetic Resonance. The EPR Symposium, which was chaired by Songi Han of Northwestern University, celebrated the 80th anniversary of Yevgeny Zavoisky's pioneering discovery of EPR in 1944, including a special one-time redesign of the conference logo.

As is traditional, the EPR Symposium kicked off with a series of pre-conference activities on the Sunday, including hands-on practical and theoretical training under the heading "EPR Educational: Hyperfine Spectroscopy and Optically Detected Magnetic Resonance". The first tutorial was given by Chandrasekhar Ramanathan (Dartmouth College) on Optically Detected Magnetic Resonance (ODMR), including an actual ODMR spectrometer that participants could experiment with. Alexey Silakov (Penn State University) then gave an interactive tutorial on Hyperfine Spectroscopy, including an open forum in which participants could share experiences and common tricks for choosing the optimum hyperfine spectroscopy method for a given spin system. This was followed by an outreach event hosted by the NIH-funded National Biomedical Resource at Cornell University (ACERT), with a presentation by Madhur Srivastava entitled "Your Worldwide In-House Resource", leading into the first Poster Mixer. The Sunday program concluded with the Bruker EPR Users' meeting showcasing the latest and greatest hardware, software and educational developments; Bruker then hosted a generous reception.

On a more somber note, the main Symposium began on Monday morning with a thirty-minute remembrance of the remarkable life of Joseph Michl, who sadly passed away at the age of 85 during a visit to Prague on May 13, 2024. A professor of chemistry at the nearby University of Colorado at Boulder since 1991, Joseph Michl had been tapped to give an invited talk at this year's EPR Symposium. Compatriot Petr Neugebauer chaired this segment of the first session on Photoexcited EPR under the apt subtitle, Singlet Fission, in which tributes were presented by Alexandr Zaykov (Czech Academy of Sciences), Yasuhiro Kobori (Kobe University) and Justin Johnson (National Renewable Energy Laboratory). As a further tribute, the remainder of the session was devoted to talks focusing on the physics and chemistry of photogenerated radical pairs in organic molecular systems.

The overall EPR Symposium comprised 13 oral sessions, two joint EPR/SSNMR sessions, and three poster sessions, featuring 57 individual talks and 94 poster presentations. The program was headlined by two Plenary Lectures, the first given in the joint EPR/SSNMR session by Christiane Timmel (University of Oxford) in recognition of her 2024 IES Medal for Chemistry, where she presented an autobiographical tale entitled "With Roots That Withstand Any Storm: A Chemist's Story of Trees, Light and Spin." This was followed the next morning by a second Plenary Lecture entitled "Perspectives in Spin Labeling EPR in the Age of AI" by Hassane Mchaourab (Vanderbilt University). In addition to presenting Christiane with her Medal, IES President Marina Bennati chaired a separate IES Award Session in which Hiroshi Hirata (Hokkaido University) received the 2024 IES Medal for Instrumentation and gave a presentation entitled "Low-Field EPR: Instrumentation Development for In Vivo Applications." This was followed immediately by the Annual General Meeting of the IES.

After the first session dedicated to Photoexcited EPR, subsequent sessions covering diverse topics were anchored by eleven Invited Speakers, including (session topic in brackets): Martyna Elas, Jagiellonian University in Kraków (EPR Imaging); Mi Hee Lim, Korea Advanced Institute of Science & Technology (Metals in Biology); Alexander Schnegg, Max Planck Institute for Chemical Energy Conversion (High-Field EPR); John Morton, University College London and London Centre for Nanotechnology (Quantum Information); Maxie Roessler, Imperial College London (In Situ EPR); Gunnar Jeschke, ETH Zurich (Spin Physics and Dynamics); Ryan Hadt, CALTECH (Quantum Information); XinXin Cai, University of Rochester (Defects and Spin Qubits); Zhongyu Yang, North Dakota State University (Structural Biology); Marina Bennati, Max Planck Institute for Multidisciplinary

Madhur Srivastava announces the Sandra Eaton Travel Award for students and postdocs to attend future Rocky Mountain EPR Symposia.

Sciences and University of Göttingen (EPR/SSNMR Joint Session); and Reza Dastvan, Saint Louis University School of Medicine (Structural Biology).

The evenings were crammed with events, including 2-½ hour poster sessions on both the Monday and Tuesday. A Conference Reception and a Banquet were held respectively on the Monday and Wednesday evenings, the latter celebrating poster award winners and the remarkable career of Thomas Prisner (Goethe Universität) who gave the after-dinner speech, where he emphasized the tremendous and important synergy between Beauty (NMR) and the Beast (EPR), of course illustrated with a wonderful sketch. The IES poster prize winners were Michal Kern (University of Stuttgart) and Karen Tsay (UC Santa Barbara) for presentations respectively entitled "Recent developments of the EPR-on-a-Chip technology, from proof of concept to real world applications" and "Tracking of Tau Protein Nucleation and Elongation with a Mini-Prion Template". Special mentions were also given to William Bittner (University of Washington), Rachelle Stowell (University of Washington) and Manav Tathacharya (Cornell University). These five individuals were selected by a committee Chaired by John Morton. One final surprise at the banquet was the announcement of the Sandra Eaton Travel award, sponsored by ACERT, with a commitment of four awards for either students or postdocs in each of the next 10 years.

The International EPR Symposium has bounced back well from the COVID years. The 2024 meeting was attended by ~160 EPR researchers from 14 different countries. Of these, 46 were students, 15 were industrial researchers and 9 were from government labs, with the remainder identifying as university PIs, postdocs or staff scientists. Of course, the success of the meeting would not have been possible without the generous support of several sponsors, including: ACERT, Bridge12, Bruker BioSpin, JEOL USA, the National High Magnetic Field Laboratory, the journal Magnetic Resonance in Chemistry (Wiley & Sons, Inc.) and, of course, the International EPR (ESR) Society! We hope that you will attend the next International EPR Symposium, which will be held in beautiful Snowbird, Utah from August 3 to 7, 2025.

Stephen Hill, Conference Vice-Chair

XIIth Conference of the European Federation of EPR groups (EFEPR 2024)
September 8–12, 2024, Marseille, France
https://efepr2024.sciencesconf.org

International Advisory Board: Marina Bennati (Göttingen), Aharon Blank (Haifa), Marilena Di Valentin (Padova), Sabine van Doorslaer (Antwerp), Pierre Dorlet (Marseille, Chairman), Inés García Rubio (Zaragoza), Bruno Guigliarelli (Marseille), Martina Huber (Leiden), Gunnar Jeschke (Zurich), Olivier Ouari (Marseille), Peter Rapta (Bratislava), Christiane Timmel (Oxford).
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The 2024 edition of the EFEPR conference happened five years after the previous one hosted in Bratislava, due to the COVID outbreak. It gathered in Marseille a total of 128 participants from Belgium, Canada, Switzerland, Germany, Denmark, Spain, France, UK, Greece, Croatia, Israel, Iceland, Italy, Lithuania, the Netherlands, Slovakia, and the United States of America and was organized by the CNRS and Aix-Marseille University. It coincided as well with the 20th anniversary of ARPE, the French EPR Association.

The scientific program consisted of 7 plenary lectures, 9 keynotes, 28 oral communications and 55 posters and covered a broad range of EPR applications throughout the fields of physics, chemistry and life sciences. In addition, three sponsor communications were given by Bruker Biospin, Cryogenic and JEOL.

Plenary lectures were given by: Sharon Ruthstein, Bar-Ilan University (IL) *The copper cellular transfer mechanism in eukaryotic and prokaryotic systems*; **Patrice Bertet**, CEA Saclay (FR) *Single-spin spectroscopy using microwave photon counting*; **Sabine Richert**, University of Freiburg (DE) *Exploring the properties of* ▶

photogenerated molecular multi-spin systems; **Daniella Goldfarb,** Weizmann Institute of Science (IL) *Distance measurements in proteins in solution and cells by ^{19}F ENDOR*; **José Vidal Gancedo**, Barcelona Institute of Materials Science (ES) *EPR in the characterization of radical dendrimers*; **Enrica Bordignon**, University of Geneva (CH) *Pros and Cons of probing dynamic proteins interactions in liquid droplets and membrane bilayers with EPR*; **Eric McInnes**, The University of Manchester (UK) *Magnetic resonance studies of supramolecular chemistry based on heterometallic rings*

Keynote lectures were given by: **Daniel Klose**, ETH Zurich (CH) *Intertwined instrumentation and method developments for multifrequency EPR hyperfine spectroscopy*; **Mantas Šimėnas**, Vilnius University (LT) *Towards the sensitivity limit of EPR cryoprobes*; **Valérie Belle**, Aix-Marseille University (FR) *Site directed spin labeling-EPR spectroscopy in all its facets*; **Claudia Tait**, University of Oxford (UK) *Characterisation of photoinduced spin states in organic photovoltaics by transient and pulse EPR*; **Emma Richards**, Cardiff University (UK) *Long-lived, ambient Cr(III)-based near-IR emission, and donor- acceptor dyads for upconversion technologies*; **Maria Fittipaldi**, University of Florence (IT) *Spin-electric effects on magnetic molecules revealed by electric-field-modulated EPR spectroscopy*; **Jan Behrends**, Freie Universität Berlin (DE) *Electron spins at work in organic radical batteries*; **Andreas Pöppl**, Leipzig University (DE) *An EPR study of hydrogen molecule adsorption on nanoporous materials*; **Bela Bode**, University of St Andrews (UK) *Pulse dipolar EPR spectroscopy in the age of computational structure prediction – new structures and functions of proteins*.

Posters were displayed throughout the conference and two poster sessions were more specifically planned on the evenings of Monday 9th and Tuesday 10th September. Two poster prizes were awarded by the International EPR Society (IES) to Zichen Wang (University of Cambridge, UK) and Dr Ilenia Serra (Aix-Marseille University, France). The IUPAB awarded an oral communication prize to Marvin Lenjer (Max Planck Institute Göttingen, DE).

The EFEPR general assembly was held before the second poster session on Tuesday and was also hosted online so that EFEPR members who could not be present at the conference would be able to attend as well. Information was given on EFEPR as a Groupement Ampère subgroup. Next events were discussed: the 10th EFEPR Summer School will be held in Manchester from August 31st till September 6th 2025. Proposals for the future schools in Spain (Barcelona/Zaragoza) in 2027 and Italy (Caorle/Padova) in 2029 were presented by Inés García Rubio and Marilena Di Valentin. Proposal for the next conference in Brno in 2026 was presented by Petr Neugebauer. These proposals were accepted unanimously. Information was then given on the EFEPR website (www.efepr.org) and the mailing list. Finally, a proposal was made for the composition and term duration of the EFEPR board: the board is composed of a president, two vice-presidents (ideally the former president and the designated future president to ensure continuity) and a secretary general. Elections would happen at the general assembly held at the EFEPR conferences. After the elections, the composition of the EFEPR board is: President Gunnar Jeschke; Vice-Presidents Inés García Rubio and Pierre Dorlet, Secretary General Daniel Klose.

Pierre Dorlet

POSITIONS

A Biochemistry/Biophysics postdoctoral researcher position

A Biochemistry/Biophysics postdoctoral researcher position in the Yang group will be available at The University of Missouri, Columbia (Mizzou), Department of Chemical and Biomedical Engineering, starting from January 2025. The successful candidate will carry out research on probing the interaction of protein conducting channels with substrate proteins. The primary tasks include transmembrane protein expression, purification, and reconstitution in lipid bilayers as well as the biophysical characterization of the relevant protein-translocation processes. Minimal request is a Ph.D. in transmembrane protein biochemistry or biophysics by January 2025. Priority will be given to individuals with experience and peer-reviewed publications in the Translocases of Outer Mitochondrial Membrane (TOM) and the Translocases of Inner Mitochondrial Membrane (TIM). Mizzou is the flagship university in Missouri and one of the Association of American Universities (AAUs). In addition to standard medical insurance and Mizzou employee benefits, the successful candidate will receive an annual salary of $55,000-$59,000, depending on experience. Special cases can be negotiated in a case-by-case manner. The position will start with a one-year contract which is renewable based on performance. Interested individuals should directly contact Dr. Yang at zhongyuyang.ucla@gmail.com or zhongyu.yang@missouri.edu

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Your Troubles

Low sensitivity
Limited ability to detect low-intensity signals or distinguish subtle differences in sample features.

Limited resolution
Outdated & Inherent physical limitations prevent EPR from capturing accuracy.

Big expense
Replacement incurred a significant expenditure

Long time
It usually takes a year to place an order for a new one

Our Solution

Higher sensitivity
Ultra-low noise microwave source and signal detection technology

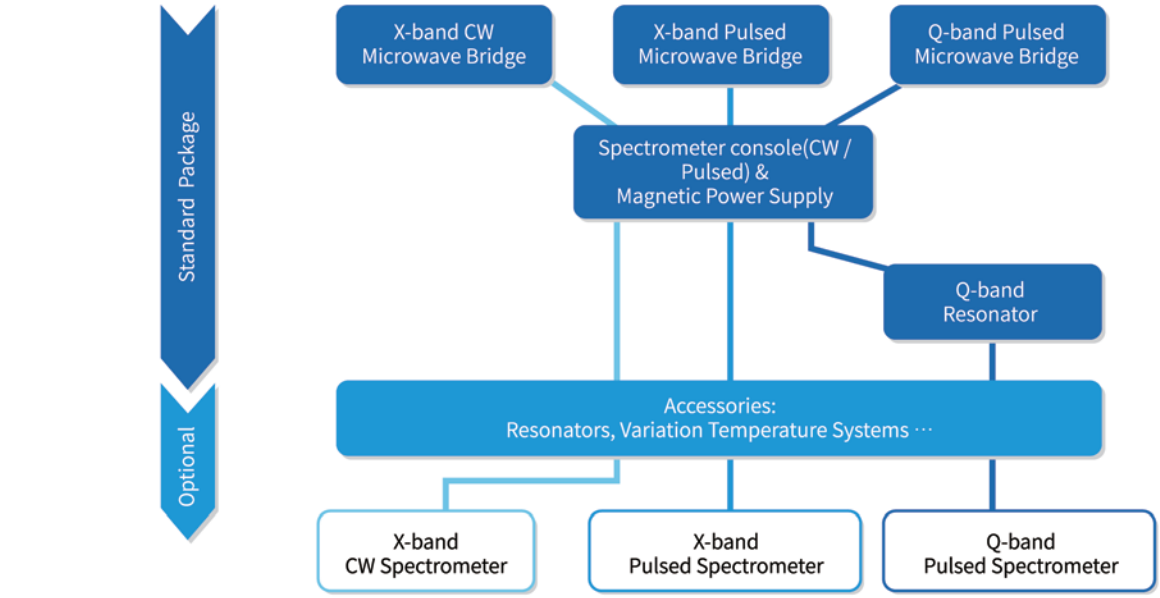
Better resolution
New precise magnetic field scanning control technology

Competitive price
Cost-effective at a limited time discounted price for 2024

Rapid modernize
Responsive modernize speed, get extraordinary efficiency

New Spectrometers ! Best Experience!

Modernize Pathways



E2 Building, Innovation Industrial Park II, High-tech District, Hefei, Anhui, China.

+86-551-62835225 *www.ciqtekglobal.com* *info@ciqtek.com*

V-2024.10

CIQTEK

CIQTEK

CW EPR Product Series

EPR200-Plus/EPR200M

X-band CW Spectrometer

Easy Access

- Auto tune , automated goniometer
- Upgrade to Q-band
- Optional TR-EPR
- Sweep range: -0.1-1.5 T or 1.8 T
- Temperature control systems:
- helium, nitrogen and high-tempra-ture system

EPR200-Plus

Accessories

X-band High-Q Resonator

Cavity resonance frequency: 9.5-9.9 GHz
Max modulation field amplitude: 20 Gauss
Unloaded Q value: ≥18000

X-band Dual Mode Resonator

Perpendicular mode: 9.6-10 GHz
Parallel mode: 9.4-9.8 GHz
Max modulation field amplitude: 10 Gauss

Nitrogen Variable Temperature System

Temperature range: 100-600 K
Temperature stability: ±0.2 K

Liquid Helium Cryogenic System

Controllable temperature range of sample area: 3.8-300 K
Temprature stability: ±0.1 K
Refrigerant : liquid helium

X-band CW Benchtop Spectrometer

Integrated and compact

- Benchtop: 50 kg, 53 × 40.5 × 26.8 cm
- Auto tune, automated goniometer
- Scan range: -0.1-0.65 T
- Numerous accessories

EPR200M

Accessories

Nitrogen Variable Temperature System

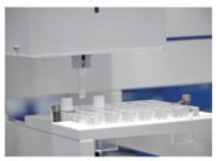
Temperature range: 100-600 K
Temperature stability: ±0.2 K

Irradiation (Optical) System

Xenon Lamp, mercury Lamp, UV-enhanced xenon lamp
Six-position motorized optical filter wheel
Compatible with optical fiber

Sample Cells

Electrolysis cell, tissue cell, flow cell system,
mixing cell system, flat cell



Auto Sampler

Handling up to 36 samples in 3-6 mm quartz tubes
Customized sampling sequence
Set experimental parameters independently for each sample

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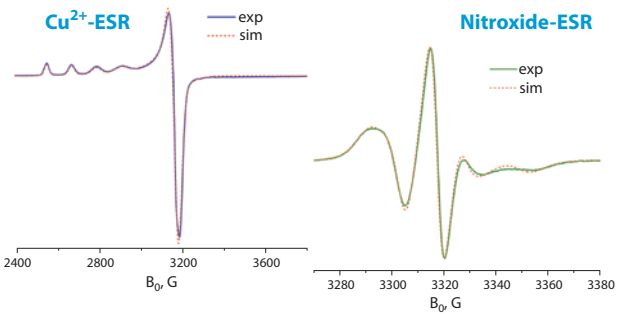
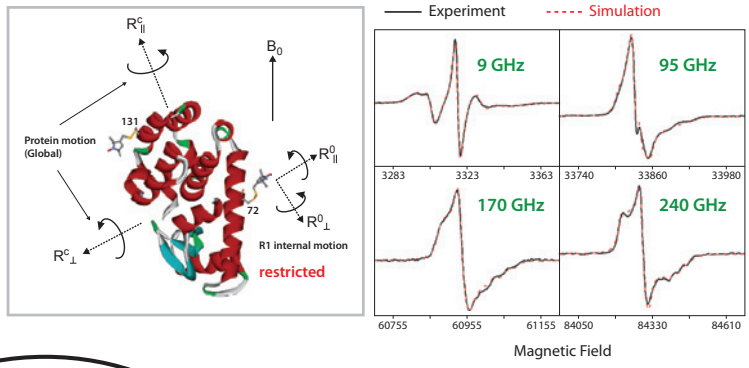
Full Range ESR Resource Funded by NIH-NIGMS

Dept. of Chemistry &
Chemical Biology
259 Feeney Way
Cornell University
Ithaca, NY 14853, U.S.A.
+1-(607)-255-4632
www.acert.cornell.edu

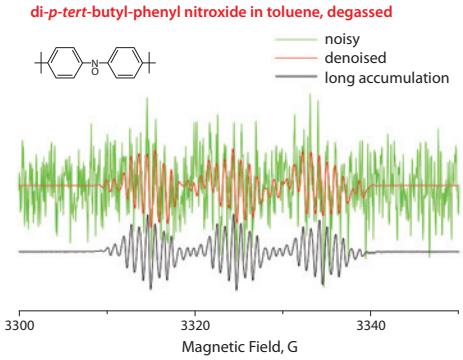
ESR Spectral Fitting



Multifrequency ESR

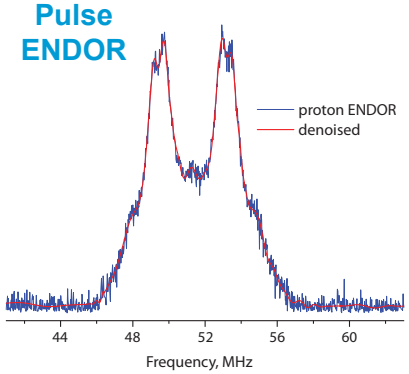


Denoising

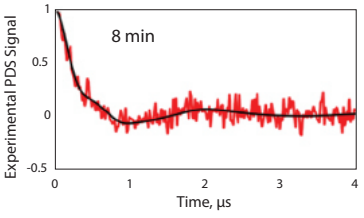


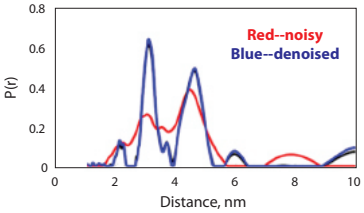
1) Perform ESR Measurements
2) ESR Data Analysis
3) Advice on ESR Experimental Design
4) Standard Samples
5) Contact Info Above

Pulse ENDOR

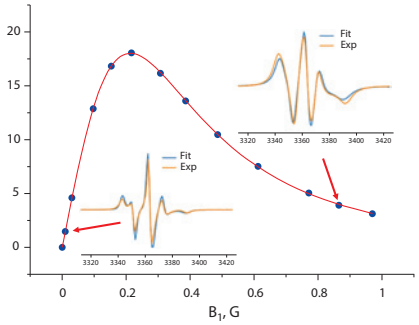


DEER & DQC



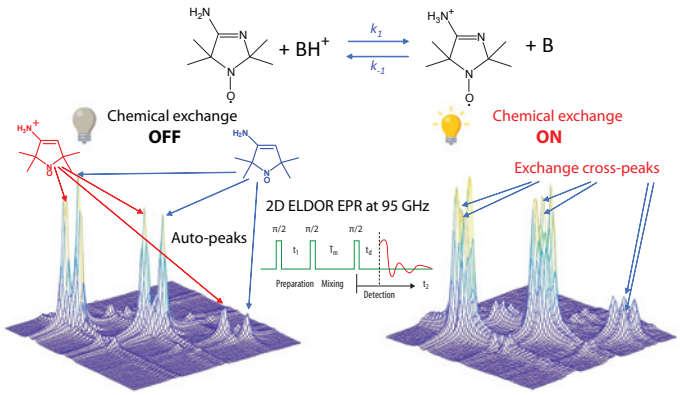


Simulation



Saturation Curve

2D ELDOR



EPR

TEMPO-tations in the Kitchen: Discovering Antioxidants in Olive Oil

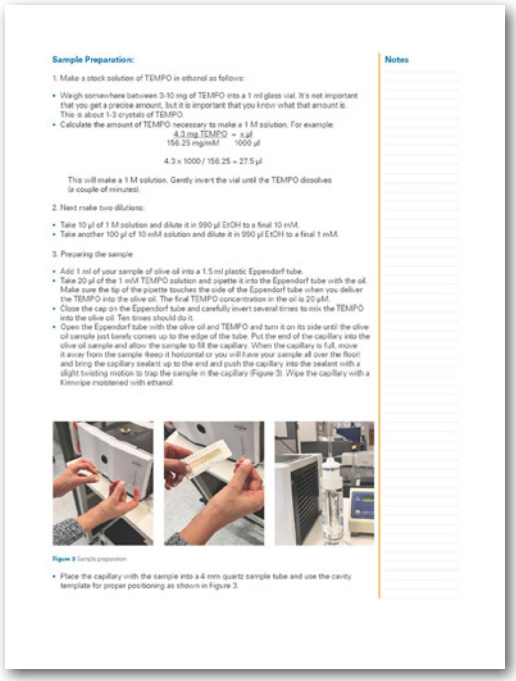
Transform Your Learning and Teaching

New EduLab: EPR of Antioxidants in Olive Oil

Whether you're a beginner or an expert in Magnetic Resonance, Bruker's #Educate2Resonate platform is your go-to resource for learning, sharing, and teaching about EPR and NMR. Our goal is to unite EPR and NMR enthusiasts worldwide, creating a supportive community for education and growth.

Want to learn how to use EPR to measure antioxidant levels in food, discover antioxidants in olive oil, and apply this method to other foods? Our olive oil dedicated EduLab offers a comprehensive understanding of how antioxidants protect our cells and how to measure these vital molecules. Explore the fascinating world of EPR and uncover the hidden antioxidant properties of olive oil.

Visit our #Educate2Resonate website to access EduLab protocols for conducting EPR experiments.



Sample Preparation:

1. Make a stock solution of TEMPO in ethanol as follows:

- Weigh somewhere between 3-10 mg of TEMPO into a 1 ml glass vial. It's not important that you get a precise amount, but it is important that you know what that amount is. This is about 1-3 crystals of TEMPO.
- Calculate the amount of TEMPO necessary to make a 1 M solution. For example:

4.3 mg TEMPO = x µl
156.25 mg/mM 1000 µl

4.3 x 1000 / 156.25 = 27.5 µl

This will make a 1 M solution. Gently invert the vial until the TEMPO dissolves (a couple of minutes).

2. Next make two dilutions:

- Take 10 µl of 1 M solution and dilute it in 990 µl EtOH to a final 10 mM.
- Take another 100 µl of 10 mM solution and dilute it in 990 µl EtOH to a final 1 mM.

3. Preparing the sample

- Add 1 ml of your sample of olive oil into a 1.5 ml plastic Eppendorf tube.
- Take 20 µl of the 1 mM TEMPO solution and pipette it into the Eppendorf tube with the oil. Make sure the tip of the pipette touches the side of the Eppendorf tube when you deliver the TEMPO into the olive oil. The final TEMPO concentration in the oil is 20 µM.
- Close the cap on the Eppendorf tube and carefully invert several times to mix the TEMPO into the olive oil. Ten times should do it.
- Open the Eppendorf tube with the olive oil and TEMPO and turn it on its side until the olive oil sample just barely comes up to the edge of the tube. Put the end of the capillary into the olive oil sample and allow the sample to fill the capillary. When the capillary is full, move it away from the sample (keep it horizontal or you will have your sample all over the floor) and bring the capillary sealant up to the end and push the capillary into the sealant with a slight twisting motion to trap the sample in the capillary (Figure 3). Wipe the capillary with a Kimwipe moistened with ethanol.

Notes

Figure 3 Sample preparation

- Place the capillary with the sample into a 4 mm quartz sample tube and use the cavity template for proper positioning as shown in Figure 3.

For more information please visit www.bruker.com

EPR

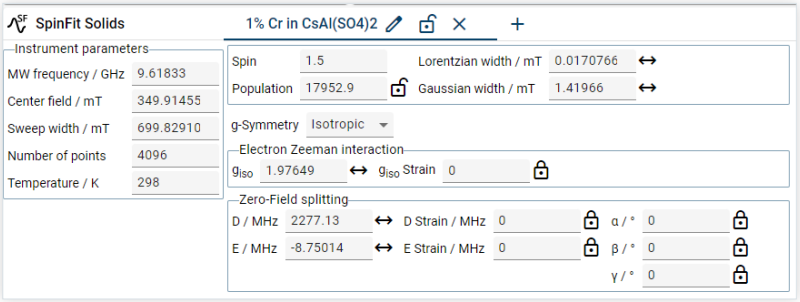
Solids Joins Liquids in SpinFit

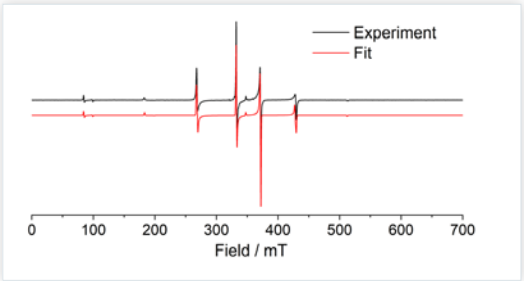
SpinFit Solids: A New Module for Spectral Simulation and Fitting of Disordered System

Computer simulations of multispecies anisotropic and experimental randomly oriented systems are a fascinating research frontier.

Extracting spin Hamiltonian parameters is crucial, and our new tool, SpinFit Solids, developed by the Bruker team, offers precise capabilities for this.

SpinFit Solids for the Magnettech ESR5000 is invaluable for advancing computational simulations. It provides comprehensive fitting capabilities, including complex parameter adjustments, matrix diagonalization, regional fitting, and support for multiple species, all in a user-friendly format.





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