



**European Network  
on NMR  
Relaxometry**



COST is supported by  
the EU Framework  
Programme Horizon  
2020

<http://eurelax.uwm.edu.pl>

## **NEWSLETTER -PAPERS**

**Dear EURELAX Members and Friends,**

The difficult time does not allow for much activities in terms of meetings, however we take the opportunity to update you about our publication achievements.

We would also like to remind you about the Special Issue:  
**Molecular Physics, Volume 117, Issue 7-8 (2019)**  
**NMR Relaxometry and Related Methods**

List of papers related to our Action is available on our webpage:  
[http://eurelax.uwm.edu.pl/](http://eurelax.uwm.edu.pl)

**However, it is important to point out that the Action also stimulated scientific ideas of research groups within single countries and a collaboration with non-COST countries – below some examples.**

1. Petr Dvorak, Maria Soltesova, Jan Lang, Microfriction correction factor to the Stokes–Einstein equation for small molecules determined by NMR diffusion measurements and hydrodynamic modelling, *Molecular Physics*, 117, 868-876 (2019), <https://doi.org/10.1080/00268976.2018.1510144>, IP:1.704, Czech Republic
2. Pierre Levitz, Probing interfacial dynamics of water in confined nanoporous systems by NMRD, *Molecular Physics*, 117, 952-959 (2019), <https://doi.org/10.1080/00268976.2018.1527960>, IP:1.704, France

3. Jerome Fresnais, QianQian Ma, Linda Thai, Patrice Porion, Pierre Levitz, Anne-Laure Rollet, NMR relaxivity of coated and non-coated size-sorted maghemite nanoparticles, *Molecular Physics*, 117, 990-999 (2019), <https://doi.org/10.1080/00268976.2018.1527410>, IP: 1.704, France
4. Marjorie Ladd-Parada, Megan J. Povey, Joselio Vieira, Michael E. Ries, Fast field cycling NMR relaxometry studies of molten and cooled cocoa butter, *Molecular Physics*, 117, 1020-1027 (2019), <https://doi.org/10.1080/00268976.2018.1508784>, IP: 1.704, United Kingdom
5. M. I. B. Tavares, E. Oliveira da Silva, P. S. R. C. Silva, P. J. Sebastiao, The use of fast field cycling to evaluate the time domain relaxation of starches from tropical fruit seeds, *Molecular Physics*, 117, 1028-1033 (2019), <https://doi.org/10.1080/00268976.2018.1540803>, IP: 1.704, Brazil, Portugal
6. Marjorie Ladd Parada, Megan J. Povey, Joselio Vieira, Michael Rappolt, Michael E. Ries, Early stages of fat crystallisation evaluated by low-field NMR and small-angle X-ray scattering, *Latest Developments and Applications of magnetic resonance in food science*, 57, 686-694 (2019), <https://doi.org/10.1002/mrc.4860>, IP: 2.035, United Kingdom
7. Vladimir V. Zhivonitko, Md Sharif Ullah, Ville-Veikko Telkki, Nonlinear sampling in ultrafast Laplace NMR, *Journal of Magnetic Resonance*, 307, 106751 (2019), <https://doi.org/10.1016/j.jmr.2019.106571>, IP: 2.624, Finland
8. Lenka Kubickova, Petr Brazda, Miroslav Veverka, Ondrej Kaman, Vit Herynek, Magda Vosmanska, Petr Dvorak, Karel Bernasek, Jaroslav Kohout, Nanomagnets for ultra-high field MRI: Magnetic properties and transverse relaxivity of silica-coated  $\epsilon$ -Fe<sub>2</sub>O<sub>3</sub>, *Journal of Magnetism and Magnetic Materials*, 480, 154-163 (2019), <https://doi.org/10.1016/j.jmmm.2019.02.067>, IP: 2.717, Czech Republic
9. Jiri Barta, Petr Hermann, Jan Kotek, Coordination Behavior of 1,4-Disubstituted Cyclen Endowed with Phosphonate, Phosphonate Monoethylester, and H-Phosphinate Pendant Arms, *Molecules*, 24(18), 3324 (2019), <https://doi.org/10.3390/molecules24183324>, IP: 3.267, Czech Republic
10. Elisa Carignani, Silvia Borsacchi, Paolo Blasi, Aurelie Schoubben, Marco Geppi, Dynamics of Clay-Intercalated Ibuprofen Studied by Solid State Nuclear Magnetic Resonance, *Mol.Pharmaceutics*, 16 (6), 2569-2578 (2019), <https://doi.org/10.1021/acs.molpharmaceut.9b00160>, IP: 4.321, Italy
11. Linda Cerofolini, Stefano Giuntini, Enrico Ravera, Claudio Luchinat, Francesco Berti, Marco Fragi, Structural characterization of a protein adsorbed on aluminum hydroxide adjuvant in vaccine formulation, *BMC Medicine*, 4, 20 (2019), <https://doi.org/10.1038/s41541-019-0115-7>, IP: 5.699, Italy
12. Laura M. Lilley, Kang Du, Mathher D. Krzyaniak, Giacomo Parigi, Claudio Luchinat, T. David Harris, Thomas J. Meade, Effect of Magnetic Coupling on Water Proton Relaxivity in a Series of Transition Metal GdIII Complexes, *Inorg. Chem.*, 57(10), 5810-5819 (2018), <https://doi.org/10.1021/acs.inorgchem.8b00120>, IP: 4.850, Italy, United States
13. Marco Fragai, Enrico Ravera, Fabio Tedoldi, Claudio Luchinat, Giacomo Parigi, Relaxivity of Gd-Based MRI Contrast Agents in Crosslinked Hyaluronic Acid as a Model for Tissues, *ChemPhysChem*, 20(17), 2204-2209 (2019), <https://doi.org/10.1002/cphc.201900587>, IP: 3.144, Italy
14. Linda Cerofolini, Stefano Giuntini, Azzurra Carlon, Enrico Ravera, Vito Calderone, Marco Fragai, Giacomo Parigi, Claudio Luchinat, Characterization of PEGylated Asparaginase: New

- Opportunities from NMR Analysis of Large PEGylated Therapeutics, *Chemistry a European Journal*, 25(8), 1984-1991 (2019), <https://doi.org/10.1002/chem.201804488>, 4.857, Italy
15. Gabriele Rolla, Valeria De Biasio, Giovanni B. Giovenzana, Mauro Botta and Lorenzo Tei, Supramolecular assemblies based on amphiphilic Mn<sup>2+</sup>-complexes as high relaxivity MRI probes, *Dalton Transactions*, 47,10660-10670 (2018), <https://doi.org/10.1039/C8DT01250D>, IP: 4.052, Italy
  16. Stefano Marchesi, Fabio Carniato, Chiara Bisio, Lorenzo Tei, Leonardo Marchese and Mauro Botta, Novel paramagnetic clays obtained through intercalation of Gd<sup>3+</sup>-complexes, *Dalton Transactions*, 47, 7896-7904 (2018), <https://doi.org/10.1039/C8DT00875B>, IP:4.052, Italy
  17. Maria Rosaria Ruggiero, Simona Baroni, Stefania Pezzana, Gianni Ferrante, Simonetta Geninatti Crich, Silvio Aime, Evidence for the Role of Intracellular Water Lifetime as a Tumour Biomarker Obtained by In Vivo Field-Cycling Relaxometry, *Heritage Science Plus Analytical Chemistry, Spectroscopy, and Bioanalysis*, 57 (28), 7468-7472 (2018), <https://doi.org/10.1002/anie.201713318>, IP: 12.959, Italy
  18. Diego Alberti, Annamaria Deagostino, Antonio Toppino, Nicoletta Protti, Silva Bortolussi, Saverio Altieri, Silvio Aime, Simonetta Geninatti Crich, An innovative therapeutic approach for malignant mesothelioma treatment based on the use of Gd/boron multimodal probes for MRI guided BNCT, *Journal of controlled release*, 28(280), 31-38 (2018), <https://doi.org/10.1016/j.jconrel.2018.04.043>, IP: 7.877 Italy
  19. Daniela Delli Castelli, Lorenzo Tei, Fabio Carniato, Silvio Aime and Mauro Botta, [Yb(AAZTA)(H<sub>2</sub>O)]<sup>-</sup>: an unconventional ParaCEST MRI probe, *Chemical Communications*, 54, 2004-2007 (2018), <https://doi.org/10.1039/C8CC00193F>, IP: 5.996, Italy
  20. Fabio Carniato, Lorenzo Tei, Jonathan Martinelli, Mauro Botta, Relaxivity Enhancement of Ditungstate Bishydrated Gadolinium(III) Complexes Conjugated to Mesoporous Silica Nanoparticles, *European Journal of Inorganic Chemistry*, 20-21, 2363-2368 (2018), <https://doi.org/10.1002/ejic.201800041>, IP: 2.529, Italy
  21. Hao Li, Giacomo Parigi, Claudio Luchinat, and Thomas J. Meade, Bimodal Fluorescence-Magnetic Resonance Contrast Agent for Apoptosis Imaging, *J. Am. Chem. Soc.*, 141(15), 6224-6233 (2019), <https://doi.org/10.1021/jacs.8b13376>, IP: 14.612, Italy, United Kingdom
  22. Giuseppe Ferrauto, Daniela Delli Castelli, Loredana Leone, Mauro Botta, Silvio Aime, Zsolt Baranyai, Lorenzo Tei, Modifying LnHPDO3A Chelates for Improved T1 and CEST MRI Applications, *Chemistry a European Journal*, 25(16), 4184-4193 (2019), <https://doi.org/10.1002/chem.201806023>, IP: 4.857, Italy
  23. Elisa Carignani, Silvia Borsacchi, Paolo Blasi, Aurélie Schoubben, Marco Geppi, Dynamics of Clay-Intercalated Ibuprofen Studied by Solid State Nuclear Magnetic Resonance, *Mol Pharm.*, 16(6), 2569-2578 (2019), <https://doi.org/10.1021/acs.molpharmaceut.9b00160>, IP: 14.612, Italy
  24. Daniela Lalli, Stefano Marchesi, Fabio Carniato, Chiara Bisio, Lorenzo Tei, Leonardo Marchese, and Mauro Botta, .Combination of solid-state NMR and <sup>1</sup>H NMR relaxometry for the study of intercalated saponite clays with the macrocyclic derivatives of Gd(III) and Y(III), *Inorganics*, 7(3), 34 (2019), <https://doi.org/10.3390/inorganics7030034>, IP:4.052, Italy
  25. Fabio Carniato and Giorgio Gatti, <sup>1</sup>H NMR Relaxometric Analysis of Paramagnetic Gd<sub>2</sub>O<sub>3</sub>:Yb Nanoparticles Functionalized with Citrate Groups, *Chemistry a European Journal*, 25(16), 4184-4193 (2019), <https://doi.org/10.1002/chem.201806023>, IP: 1.467, Italy

26. Giuseppe Ferrauto, Daniela Delli Castelli, Loredana Leone, Mauro Botta, Silvio Aime, Zsolt Baranyai, Lorenzo Tei, Modifying LnHPDO3A Chelates for Improved T<sub>1</sub> and CEST MRI Applications, *Chemistry a European Journal*, 25(16), 4184-4193 (2019), <https://doi.org/10.1002/chem.201806023>, IP: 4.857, Italy
27. Enza Di Gregorio, Giuseppe Ferrauto, Stefania Lanzardo, Eliana Gianolio and Silvio Aime, Use of FCC-NMRD relaxometry for early detection and characterization of ex-vivo murine breast cancer, *Scientific Reports*, 9, 4624 (2019), <https://doi.org/10.1038/s41598-019-41154-9>, IP: 3.998, Italy
28. Simona Baroni, Maria Rosaria Ruggiero, Silvio Aime, Simonetta Geninatti Crich, Exploring the tumour extracellular matrix by in vivo Fast Field Cycling relaxometry after the administration of a Gadolinium-based MRI contrast agent, *Low-field NMR*, 57(10), 845-851 (2019), <https://doi.org/10.1002/mrc.4837>, IP: 2.035, Italy
29. Ferritin: A Platform for MRI Contrast Agents Delivery. Maria Rosaria Ruggiero, Diego Alberti, Valeria Bitonto and Simonetta Geninatti Crich, Ferritin: A Platform for MRI Contrast Agents Delivery, *Inorganic*, 7(3), 33 (2019), <https://doi.org/10.3390/inorganics7030033>, IP: 1.467, Italy
30. Valeria Lagostina, Loredana Leone, Fabio Carniato, Giuseppe Digilio, Lorenzo Tei and Mauro Botta, Electronic Effects of the Substituents on Relaxometric and CEST Behaviour of Ln(III)-DOTA-Tetraanilides, *Inorganics*, 7(4), 43 (2019), <https://doi.org/10.3390/inorganics7040043>, IP: 1.467, Italy
31. Mauro Botta, Fabio Carniato, David Esteban-Gómez, Carlos Platas-Iglesias and Lorenzo Tei, Mn(II) compounds as an alternative to Gd-based MRI probes, *Future Medicinal Chemistry*, 11,12 (2019), <https://doi.org/10.4155/fmc-2018-0608>, IP: 3.250, Italy, Spain
32. A. Boni, A. M. Basini, L. Capolupo, C. Innocenti, M. Corti, M. Cobianchi, F. Orsini, A. Guerrini, C. Sangregorio and A. Lascialfari, Optimized PAMAM coated magnetic nanoparticles for simultaneous hyperthermic treatment and contrast enhanced MRI diagnosis, *RSC Advances*, 7, 44104-44111 (2017), <https://doi.org/10.1039/C7RA07589H>, IP: 3.070, Italy
33. M. Basini, A. Guerrini, M. Cobianchi, F. Orsini, D. Bettega, M. Avolio, C. Innocenti, C. Sangregorio, A. Lascialfari, P. Arosio, Tailoring the magnetic core of organic-coated iron oxides nanoparticles to influence their contrast efficiency for Magnetic Resonance Imaging, *Journal of Alloys and Compounds*, 770, 58-66 (2019), <https://doi.org/10.1016/j.jallcom.2018.08.120>, IP: 4.650, Italy
34. Mancin, Federico Rastrelli. Nanoparticle-Assisted NMR Spectroscopy: Enhanced Detection of Analytes by Water-Mediated Saturation Transfer. *Journal of the American Chemical Society*, 141(12), 4870-4877 (2019), <https://doi.org/10.1021/jacs.8b13225>. IP: 14.612, Italy
35. Jiří Bárta, Petr Hermann, Jan Kotek. Coordination Behavior of 1,4-Disubstituted Cyclen Endowed with Phosphonate, Phosphonate Monoethylester, and H-Phosphinate Pendant Arms *Molecules*, 24(18), 3324 (2019), <https://doi.org/10.3390/molecules24183324>, IP: 3.267, Czech Republic
36. Soňa Procházková, Vojtěch Kubiček, Zuzana Böhmová, Kateřina Holá, Jan Koteka, Petr Hermann. DOTA analogues with a phosphinate-iminodiacetate pendant arm: modification of the complex formation rate with a strongly chelating pendant. *Royal Society of Chemistry*, 46, 10484-10497 (2017), <https://doi.org/10.1039/C7DT01797A>, IP: 4.052, Czech Republic
37. Jan Blahut, Karel Bernášek, Andrea Gálisová, Vít Herynek, Ivana Císařová, Jan Kotek, Jan Lang, Stanislava Matějková, Petr Hermann. Paramagnetic <sup>19</sup>F Relaxation Enhancement in Nickel(II) Complexes of N-Trifluoroethyl Cyclam Derivatives and Cell Labeling for <sup>19</sup>F MRI, *Inorganic*

*Chemistry*, 56(21), 13337–13348 (2017), <https://doi.org/10.1021/acs.inorgchem.7b02119>, IP: 14.612, Czech Republic

38. Ursa Mikac, Ana Sepe, Anton Gradisek, Julijana Kristl, Tomaz Apih, Dynamics of water and xanthan chains in hydrogels studied by NMR relaxometry and their influence on drug release, *International Journal of Pharmaceutics*, 563, 373-383 (2019), <https://doi.org/10.1016/j.ijpharm.2019.04.014>, IP: 4.845, Slovenia
39. Max Flämig, Marius Hofmann, Anne Lichtinger, Ernst A. Rössler, Application of proton field-cycling NMR relaxometry for studying translational diffusion in simple liquids and polymer melts, *Magn Reson Chem.*, 57, 805, (2019), <https://doi.org/10.1002/mrc.4823>, IF: 2.035, Germany
40. Leonid Grunin, Mecit Halil Oztop, Selen Guner, Saadet Fatma Baltaci, Exploring the crystallinity of different powder sugars through solid echo and magic sandwich echo sequences, *Latest Developments and Applications of magnetic resonance in food science*, 57, 607-615 (2019), <https://doi.org/10.1002/mrc.4866>, IP: 2.035, Russian Federation, Turkey