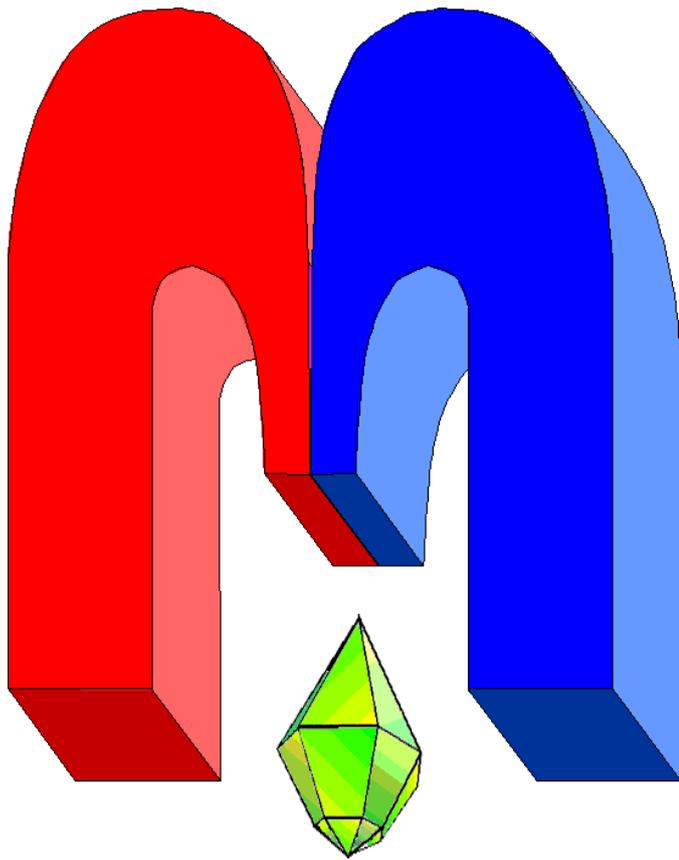


ISSN 2072-5981
doi: 10.26907/mrsej



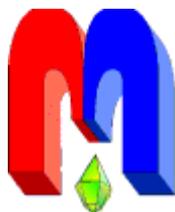
***magnetic
Resonance
in Solids***

Electronic Journal

*Volume 21
Special Issue 3
Paper No 19301
1-9 pages
2019*

doi: 10.26907/mrsej-19301

<http://mrsej.kpfu.ru>
<http://mrsej.ksu.ru>



Established and published by Kazan University
Endorsed by International Society of Magnetic Resonance (ISMAR)
Registered by Russian Federation Committee on Press (#015140),
August 2, 1996
First Issue appeared on July 25, 1997

© Kazan Federal University (KFU)*

"Magnetic Resonance in Solids. Electronic Journal" (MRSej) is a peer-reviewed, all electronic journal, publishing articles which meet the highest standards of scientific quality in the field of basic research of a magnetic resonance in solids and related phenomena.

Indexed and abstracted by
Web of Science (ESCI, Clarivate Analytics, from 2015), Scopus (Elsevier, from 2012), RusIndexSC (eLibrary, from 2006), Google Scholar, DOAJ, ROAD, CyberLeninka (from 2006), SCImago Journal & Country Rank, etc.

Editor-in-Chief

Boris **Kochelaev** (KFU, Kazan)

Honorary Editors

Jean **Jeener** (Universite Libre de Bruxelles, Brussels)

Raymond **Orbach** (University of California, Riverside)

Executive Editor

Yurii **Proshin** (KFU, Kazan)
mrsej@kpfu.ru



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

 This is an open access journal which means that all content is freely available without charge to the user or his/her institution. This is in accordance with the [BOAI definition of open access](https://www.boai.ru/).

Editors

Vadim **Atsarkin** (Institute of Radio Engineering and Electronics, Moscow)

Yurij **Bunkov** (CNRS, Grenoble)

Mikhail **Eremin** (KFU, Kazan)

David **Fushman** (University of Maryland, College Park)

Hugo **Keller** (University of Zürich, Zürich)

Yoshio **Kitaoka** (Osaka University, Osaka)

Boris **Malkin** (KFU, Kazan)

Alexander **Shengelaya** (Tbilisi State University, Tbilisi)

Jörg **Sichelschmidt** (Max Planck Institute for Chemical Physics of Solids, Dresden)

Haruhiko **Suzuki** (Kanazawa University, Kanazava)

Murat **Tagirov** (KFU, Kazan)

Dmitrii **Tayurskii** (KFU, Kazan)

Valentine **Zhikharev** (KNRTU, Kazan)

Technical Editors of Issue

Maxim **Avdeev** (KFU)

Alexander **Kutuzov** (KFU)

* In Kazan University the Electron Paramagnetic Resonance (EPR) was discovered by Zavoisky E.K. in 1944.

Boris in Zurich – Hugo in Kazan

Hugo Keller

Physik-Institut der Universität Zürich, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland

E-mail: keller@physik.uzh.ch

(Received March 28, 2019; accepted March 31, 2019; published April 19, 2019)

In this article I present a short review on the intense and fruitful collaboration of Boris Kochelaev with our group around K. Alex Müller at the Physics Institute of the University of Zurich. I will not only focus on the scientific part of this collaboration, but also rather on the human and social side of Boris as a friend and scientist.

1. How it started

I have known and worked with Prof. Boris Kochelaev since 1993 when he started to collaborate with Prof. K. Alex Müller and myself in the field of high-temperature superconductivity at the Physics Institute of the University of Zurich (Fig. 1). Boris and Alex both conducted pioneering work in the field of electron paramagnetic resonance (EPR) and knew each other long before the discovery of high-temperature superconductivity by J.G. Bednorz and K.A. Müller in 1986 [1]. Together with Boris and other colleagues from Kazan State University (now Kazan Federal University) we initiated a scientific collaboration in the framework of the International Program SCOPES, sponsored by the Swiss National Science Foundation. As a result of our very fruitful collaboration, we published several remarkable and well recognized papers related to EPR studies of highly correlated electron systems (cuprates, manganates). Some examples are given in Refs. [2–8]. In all these papers Boris made significant theoretical contributions to the interpretation and understanding of the EPR experiments. With my retirement in 2014 this scientific collaboration ended after more than twenty years due to missing financial support. However, we are still in contact – a very good friend you do not lose.

2. Boris in Zurich

In the framework of the SCOPES program Boris and his PhD students as well as other colleagues from Kazan State University visited our institute every year for a few months. During his visits in Zurich Boris used to stay in the comfortable house of Prof. Verena Meyer, an experimental nuclear physicist and former rector of our university (Fig. 2). As a very open minded person Verena enjoyed to host guests from Russia, since she also spoke fluently Russian. Unfortunately, Verena passed away in 2018. When Boris or colleagues of him from Kazan visited our institute we always had a great time. In our group meetings we had very fruitful scientific discussions, and Boris was always very interested in the current experiments we were doing. Sometimes we also had small parties with food and wine in the group meetings to celebrate special occasions. Boris also enjoyed very much to take part at various social events which took place at our institute like the Christmas Dinner (*Chlausabend*) (Figs. 3 and 4) or scientific conferences (Fig. 5). In the summer time we organized grill parties on the university campus, and Boris and his family were always participating with enthusiasm (Fig. 6). For our younger group members Boris was like a father. His friendly character and his scientific competence were very much appreciated by our master and PhD students as well as the senior group members.



Figure 1. Prof. K. Alex Müller, Physik-Institut der Universität Zürich (2000).



Figure 2. Prof. Verena Meyer, Physik-Institut der Universität Zürich (2002).



Figure 3. Boris and Hugo at the Christmas Dinner (*Chlausabend*) at the Physik-Institut der Universität Zürich (1998).

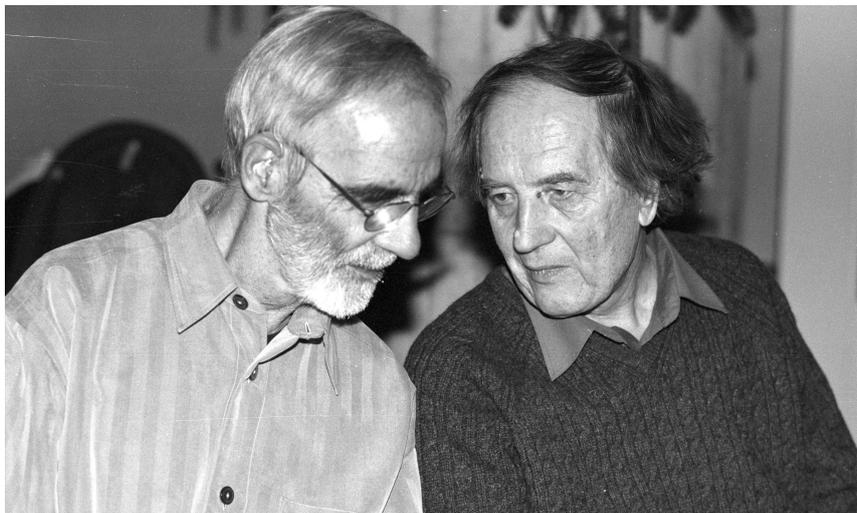


Figure 4. Boris and Prof. Franz Waldner at the Christmas Dinner (*Chlausabend*) at the Physik-Institut der Universität Zürich (2003).



Figure 5. Boris at the *International Symposium in Honor of J.G. Bednorz and K.A. Müller – 20 years after the discovery of cuprate superconductors*, Physik-Institut der Universität Zürich (2006).



Figure 6. Boris at the grill party of our group, Irchel Campus of the Universität Zürich (2012).

3. Hugo in Kazan

My first stay in Kazan in 1997 was also my first trip to Russia. In the framework of the SCOPES program I visited Kazan State University and met besides of colleagues of the Physics Department also several scientists from various departments of natural sciences. I also presented a seminar talk at the Theoretical Physics Department on vortex matter in high-temperature superconductors (Fig. 7). Especially, I enjoyed very much the dinner with Boris and his wife at their home with delicious Russian food and lots of vodka. We also made a nice trip on the Volga river to the dacha of Boris where he prepared an excellent dinner with shashlik for us (Figs. 8, 9, and 10). We had a great time together!

The second time I visited Kazan was in 2004 where I attended an international conference entitled *Nanoscale properties of condensed matter probed by resonance phenomena* which was organized by Boris and his colleagues from Kazan. A number of distinguished speakers from all

over the world were presenting talks, in particular Prof. K. Alex Müller. I also remember the fantastic conference dinner which took place in a boat on the Volga river. The scenery and the sun set were just amazing, and the vodka kept us in an excited mood.

In 2011 the *International Conference Resonances in Condensed Matter Devoted to the Century of Prof. S.A. Altshuler* took place at Kazan Federal University where I was invited to present a talk (Fig. 11). Again I had a great time with handsome people from Kazan and abroad (Figs. 12 and 13), and in particular with Boris and his wife at their home. We also made a beautiful conference excursion to an old monastery at the Volga river.

In 1944 Y.K. Zavoisky discovered electron paramagnetic resonance in Kazan. In order to celebrate his groundbreaking discovery 70 years ago, an international conference named *International Conference on Magnetic Resonance: Fundamental Research on Pioneering Applications* took place at Kazan Federal University in 2014. I had the great honor to present an invited talk at this conference. I remember the warm hospitality of Boris and his wife and the exciting excursion to a monastery followed by a delicious Russian conference dinner (Figs. 14 and 15).



Figure 7. Boris and Hugo at the Theoretical Physics Department, Kazan State University (1997).



Figure 8. Boris and Hugo at the Volga river close to his dacha (1997).



Figure 9. Boris and Hugo in the front of his dacha at the Volga river (1997).



Figure 10. Boris is preparing shashlik in front of his dacha (1997).



Figure 11. Old lecture hall at Kazan Federal University where the symposium took place (2011).



Figure 12. Prof. Annette Bussmann-Holder and Hugo at Kazan Federal University (2011).



Figure 13. Prof. Alexander Shengelaya and Hugo in the Zavoisky Museum at Kazan Federal University (2011).



Figure 14. Boris and Edith Keller on the conference excursion near the Volga river (2014).



Figure 15. Russian church near the Volga river (2014).

4. Who is Boris?

In my opinion Boris is one of the world leading theoretical physicists concerning the application of magnetic resonance methods to investigate microscopic electronic and magnetic properties of condensed matter systems. He has made important and remarkable contributions in various areas of modern solid state physics, such as spin kinetics and magnetic resonance in solids, non-linear phenomena in spin-phonon systems, magnetic properties of low-dimensional magnetic systems and conventional and cuprate high-temperature superconductors, to give only a few examples. In particular, I would like to mention his significant input related to EPR studies of cuprate high-temperature superconductors, work he has partly performed in collaboration with our group. In a scientific article K. Alex Müller highlights well the pioneering and fundamental work of Boris for understanding high-temperature superconductivity [9].



Figure 16. Prof. K. Alex Müller and Prof. Annette Bussmann-Holder at a scientific meeting in Zollikerberg, Switzerland (2018).

As a result of his original, comprehensive and productive work, Boris has published more than 150 papers in well recognized international journals as well as two books. His remarkable scientific work is well received in the international scientific community. For his outstanding theoretical contributions to magnetic resonance in condensed matter systems, he received several honnors from the USSR, the Republic of Tatarstan, the Russian Federation, and the Kazan University.

With his friendly, warm and modest character and with his intriguing sense of humor Boris easily makes contact with all types of people. It is indeed a great pleasure to collaborate with such a cordial person like Boris. Besides of his excellent scientific achievements, he also educated many young students who are now occupying well recognized positions worldwide. He played for them the role not only of a scientific father, but also a live long friend and advisor.

“The more sand that has escaped from the hourglass of our life, the clearer we should see through it.” (Jean-Paul Sartre)

On April 19, 2019 Boris celebrates his 85th Birthday. Happy Birthday, dear Boris! Annette, Alex, and myself wish you and your family all the best for the future, and in particular happiness, success, and good health (Fig. 16). Thank you very much Boris for all the wonderful time we spent together.

Acknowledgments

I am very grateful to Annette Bussmann-Holder and Rosmarie Rössel for fruitful comments and suggestions. I also would like to thank Rosmarie Rössel and Vladimir Ivanshin who provided most of the photos.

References

1. Bednorz J.G., Müller K.A. *Z. Phys. B – Condensed Matter* **64**, 189 (1986)
2. Shengelaya A., Zhao G.-M., Keller H., Müller K.A., Kochelaev B.I. *Phys. Rev. B* **61**, 5888 (2000)

3. Shengelaya A., Keller H., Müller K.A., Kochelaev B.I., Conder K. *J. Supercond.* **13**, 955 (2000)
4. Kochelaev B.I., Safina A.M., Shengelaya A., Keller H., Müller K.A., Conder K. *Mod. Phys. Lett. B* **17**, 415 (2003)
5. Shengelaya A., Bruun M., Kochelaev B.I., Safina A., Conder K., Müller K.A. *Phys. Rev. Lett.* **93**, 017001 (2004)
6. Shengelaya A., Kochelaev B.I., Conder K., Keller H. in *High T_c Superconductors and Related Transition Metal Oxides*, eds. A. Bussmann-Holder and H. Keller (Springer-Verlag, Berlin, Heidelberg, 2007), pp. 287-302
7. Maisuradze A., Shengelaya A., Kochelaev B.I., Pomjakushina E., Conder K., Keller H., Müller K.A. *Phys. Rev. B* **79**, 054519 (2009)
8. Vishina A.A., Maisuradze A., Shengelaya A., Kochelaev B.I., Keller H. *J. Phys.: Conf. Ser.* **394**, 01214 (2012)
9. Müller K.A. *EPR Newsletter* **22**, 5 (2012)