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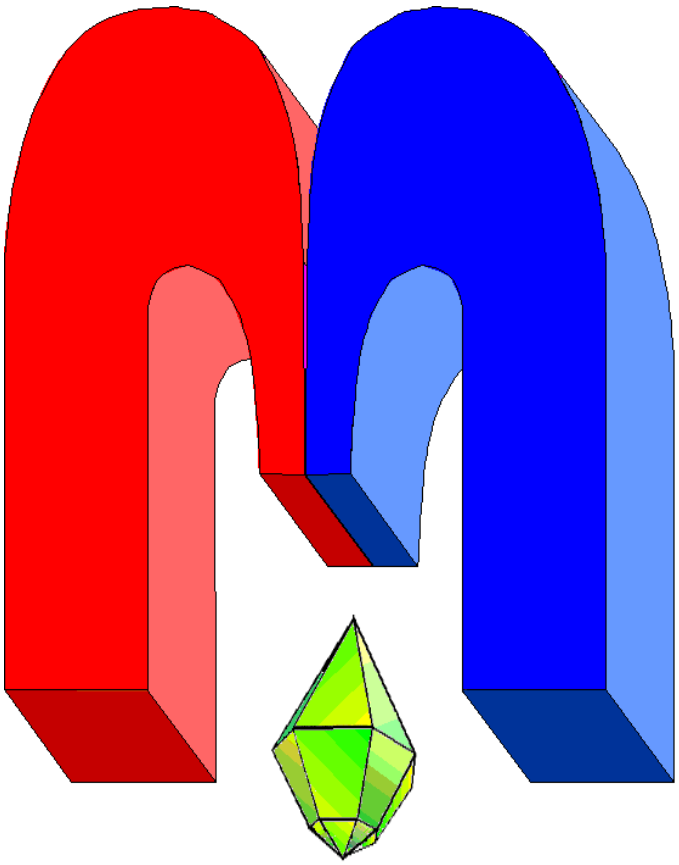

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* In Kazan University the Electron Paramagnetic Resonance (EPR) was discovered by Zavoisky E.K. in 1944.

XIX International Youth Scientific School "Actual Problems of Magnetic Resonance and its Application"†

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The International School of young scientists "Actual Problems of Magnetic Resonance and its Application" is held annually in Kazan since 1997. The School organizers are the Kazan Federal University and the E.K. Zavoisky Kazan Physical-Technical Institute of the RAS. The XIX school (hereinafter School-2016) took place in the period of 24 – 28 October, 2016 at the Kazan Federal University, where the electron paramagnetic resonance phenomenon was discovered in 1944 by E.K. Zavoisky. Russian Foundation for Basic Research, FASO and the Institute of Perspective Researches of the Academy of Sciences of the Republic of Tatarstan actively participated in the organization of the School-2016.

The students and young scientists from many scientific and educational centers of Russia and the former CIS countries are regular participants of the School. The well-known scientists from Germany, France and other leading countries in the field of magnetism and solid state physics are invited as the School lecturers. This year, Kazan was visited by young scientists from Moscow, Yekaterinburg, Novosibirsk, Chernogolovka, Ivanovo, Rostov-on-Don. Young scientists from Ukraine (from Donetsk and Kiev) also attended the School-2016. Young scientists presented 28 oral reports. Leading scientists from Russia and from the countries listed above gave 13 lectures.

Magnetic resonance has a long and rich history and remains today one of the most powerful methods of scientific research. It is widely used not only in condensed matter physics, but also in organic and inorganic chemistry, biology and medical physics. Both fundamental and applied studies are carried out on the basis of the magnetic resonance method. All this was reflected in the topics of lectures and oral presentations of young participants at the School-2016. In particular, it is important that the School-2016 was opened with the lecture by Yu.M. Bun'kov (Grenoble, France) "Supermagnonics" giving an account of the spin-wave superfluidity. At present supermagnonics is a field of the fundamental research, while at the same time, its practical value is also obvious now. One of the lectures in the last day of the School-2016 was the lecture by Uwe Eichhoff (Ettlingen, Germany) "Preclinical magnetic resonance imaging" giving an account of the state-of-the-art magnetic resonance imaging, i.e., the medical aspect of the use of magnetic resonance was reflected. In other lectures of our foreign participants (E. Goovaerts, Antwerp, Belgium, V.E. Kataev, Dresden, Germany) and the leading Russian scientists (F.S. Dzheparov, M.Yu. Presnyakov, Moscow, E.B. Fel'dman, Chernogolovka, I.R. Mukhamedshin, M.R. Gafurov, I.A. Larionov, R.M. Eremina, S.B. Orlinski, Kazan) a wide range of applications of magnetic resonance was considered: modern development of the of magnetic resonance technique, subterahertz EPR spectroscopy, applications of

† This material is prefaced a publication of papers selected at XIX International Youth Scientific School "Actual problems of magnetic resonance and its application", Kazan, 24 – 28 October 2016.

magnetic resonance for studying oils, macro -, micro- and nanodiamonds, studies of low-dimensional systems, spin dynamics and its application in quantum informatics, in high-temperature superconductors as well as theoretical issues of magnetic resonance. In his lecture, V.A. Zhikharev, Vice-Rector of the School-2016, highlighted the twenty-year history of the International School of young scientists "Actual Problems of Magnetic Resonance and its Application".

The reports of the young participants of the School-2016 were concerned with the equally wide range of scientific research using magnetic resonance technique and methods. Their scientific level as well as the ability of young scientists to report about their research results, to communicate to the audience, to make contact with it, to discuss scientific results were assessed by the competent selection committee composed of: F.S. Dzheparov, E.B. Fel'dman, S.B. Orlinsky, M.S. Tagirov (Rector of the School-2016), and V.A. Zhikharev. The jury underlined the overall high level of scientific papers of young scientists, particularly the reports by Marsel Bakirov (Kazan) "Analysis of manifestations of spin exchange and dipole-dipole interactions in EPR spectra of nitroxyl radical solutions", Georgii Bochkin (Chernogolovka) "Dipolar relaxation of multiple-quantum MNR coherences in a linear homogeneous chain of ^{19}F nuclei in calcium fluoroapatite", Gleb Dolgorukov (Kazan) "Spin kinetics of ^{3}He in contact with detonation nanodiamonds, Dar'ya Nuzhina (Kazan) "Synthesis and study of the magnetic properties of micro- and nanosize powders $LiTbF_4$ and TbF_3", and Dar'ya Shurtakova (Kazan) "EPR and Spin-lattice relaxation in nanoscale hydroxyapatite powder". All these participants were awarded with certificates. The selection committee determined three winners of the competition of reports of young participants of the School-2016, who were awarded with diplomas and valuable prizes.

1. Sergei Vasil'ev (Chernogolovka) for the report "Multiple-quantum NMR in hybrid organic-inorganic silica gels and aerogels", in which the possibility of the separation of silicon materials with the similar composition but different structures was studied using multiquantum nuclear magnetic resonance;
2. Yuliya Krasnikova (Moscow) for the report "Antiferromagnetic resonance in noncollinear antiferromagnet $Mn_3Al_2Ge_3O_{12}$", in which the frequency-field dependence of the antiferromagnetic resonance of manganese garnet was studied in a wide frequency range for different orientations;
3. Timur Safin (Kazan) for the report "Pulse NMR investigations of $MnCO_3$", in which the unusual behavior of the spin echo signal in the $MnCO_3$ sample was observed and the formation of coherent spin precession was confirmed experimentally.

As a result of the work of the School-2016, it is possible to state that the research in Russia covers the total scope of applications of magnetic resonance methods. These studies are at the global scientific level, which allows Russian scientists to be one of the world leaders in this field. The rather high level of the scientific equipment used by Russian researchers may be emphasized, at the same time, some shortage of staff may be noted. Thus, the scientific school-conferences, like our School, contributing to the growth of qualification of young scientists, the establishment of close contacts between the various research centers and friendly relations between young scientists from different cities and countries are extremely useful. Physicists of the Kazan very well understand this and so always welcomes scientific guests in this wonderful scientific and historical center of Russia.