



Valeriy Yu. LYAKHNO

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PERSONAL:

Date of birth:	December 3, 1971
Place of birth:	Kharkov, Ukraine
Citizenship:	Ukrainian
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SUMMARY: Proficient with super-low-noise measurements based on SQUID- detectors by magnetically shielding equipment and implementation of stochastic resonance technique in SQUID applications. Designing & developing of high efficiency FRP Dewar for biomagnetic measurement, especially for multichannel SQUID-based cardio scanner and magneto encephalograph.. Strong experience in fabricating of nanoscale structures by means of thin film deposition techniques, preparation and investigation hereof. Hands-on experience in developing of superconductive detectors based on Josephson junctions and structures for IR wavelength system. Have technical skills in spectroscopy software application methods and numerical mathematical toolbox modeling packages, strength and thermal conductivity computations. Familiar with basics of producing technical documentation and drawings can produce technical documentation and drawings.

PROFESSIONAL EXPERIENCE:

2015-present Senior Researcher, B. Verkin Institute for Low Temperature Physics and Engineering of National Academy of Science of Ukraine;

- Experimentally controlled Stochastic Resonance in a Superconducting Quantum Interferometer.

2002-2015 Senior Engineer, Department of Superconductive and Mesoscopic Structures, B. Verkin Institute for Low Temperature Physics and Engineering of National Academy of Science of Ukraine;

- Developed of magnetically shielded equipment and implementation of stochastic resonance technique in SQUID applications.
- Executive manager for the projects “Creation of FRP Dewar for Multichannel Magnetic Encephaloscope” and “Super-low-noise Helium FRP Dewar with high efficiency”. Developed of design, improved of technological aspects of fabrication, optimized of thermal insulation structure, fabrication supervised.
- Had a leading participation in elaboration of unique FRP Dewar with purpose of measurements in high pulsed magnetic fields in request from Hochfeld-Magnetlabor Dresden Laboratory, Germany. Engineering design, super-insulation developing and fabrication supervising executed.

- Participated in collaboration to design and fabricate the pilot-sample of special-purpose liquid helium Dewar for magnetic susceptibility measurement based on RF SQUID magnetometer. Engaged in whole installation designing, developed of superinsulation structure and supervised of manufacturing.
- Member of the research team of the project of “Fiber-Reinforced-Plastic (FRP) Dewar intended for multichannel scanning HTSC SQUIDs microscope”. Responsible for design and assembling of thermal super-insulation packages and vacuumized of Dewar cryogenic tank.
- Optimized methods of film preparation: thermal deposition, DC&RF magnetron sputtering, E-beam evaporation and ion scattering.
- Developed of structure and improvement of Single Photon IR Counter fabrication technologies.
- Characterized thin film properties (surface film analysis, X-ray diffraction, scanning electron microscopy, Auger and X-ray photon-electron spectroscopy, Energy dispersion photon spectroscopy).
- Developed and manufactured of structures with Josephson junctions and SQUIDs on ordinary and High-temperature superconductors (HTSC).

2000-2002 Senior Researcher, Department of Spacecraft Power Units, Zhukovsky National Aerospace “Kharkov Aviation Institute” University;

- Engaged in techniques of thin films plasma deposition; improved of technology of plasma deposition on thin films of high-temperature superconductive compounds like YBaCuO; developed methods of electro-technical measurement of film properties.

1997-2000 Post-graduate Student, Department of Spacecraft Power Units, State Aerospace “Kharkov Aviation Institute” University;

- Post-graduate session under the research issue “Methodic Development of Multi-Component Coatings Deposited by Effect of Pulse Discharge in Plasma”.
- Delivered lectures of some technical courses as “Vacuum techniques” and “Gas discharge and electrodes processes” at KhAI University.
- Designed of high-vacuum facilities with pumping means for plasma generator tools.

1995-1997 Junior Researcher, Department of Spacecraft Power Units, State Aerospace “KhAI” University;

- Investigated technical application of superconductivity, particularly of in-accelerator charged particles and plasma traps.
- Provided of electrodynamic calculations of plasma motion.
- Studied phenomenon of discharge of the pulse electrodynamic plasma-accelerator and methods of plasma diagnostics.

DEGREES:

2013 Ph.D in specialty: Refrigerating and cryogenic engineering, system of conditioning, ILTPE (“FRP Dewars for High-Resolution SQUID Magnetometers”);

1995 M.S. State Diploma in Mechanic - Engineer, Kharkov Aviation Institute named after N.E. Zhukovsky (specialty: Engines and Energy-power Units of Spacecraft Vehicles);

AWARDS, GRANTS, MEMBERSHIPS:

2011-2012 Project-manager for developing and fabrication of Super-low-noise Helium FRP Dewar with high efficiency in collaboration dealing with National Governmental Innovation Program “Creation of 9-Channel Magnetic Cardio Scanner”;

2004-2006 INTAS Research Project #03-51-4145 "Superconducting Hot Electron Single-photon Counter for Terahertz Radioastronomy";

- 2000-2002** Grant of Science & Technology Center in Ukraine, project # GO-14 #Gr-14j “Creation of ecologically pure drying plants and development of power-saving technologies for agricultural production processing and preservation”;
- 2000** Grant of U.S. Civilian Research & Development Foundation (CRDF) Cooperative Grants Program, project # UP2-301 “Improvement of the High-temperature Superconductors Technology by the Disarmament Conversion of Plasma Guns”;
- 1997-1999** Grant of Science & Technology Center in Ukraine, project # 447 "Grain-Crops Microwave Protection at Agricultural Enterprises of Ukraine".

SELECTED PUBLICATIONS:

- **Isolation of a Josephson Qubit from electromagnetic environment** / V.I. Shnyrkov, A.M. Korolev, O.G. Turutanov, V.M. Shulga, V.Yu. Lyakhno, and V.V. Serebrovsky // *Low Temperature Physics*, 2015, vol 41, N11, pp.1109-1118, doi: 10.1063/1.4935839;
- **Stochastic resonance in RF SQUID with shunted ScS junction** / O. G. Turutanov, V.Yu. Lyakhno, V.A. Golovanevskiy, V. I. Shnyrkov // *Physica A*, 2014, Vol. 396, p. 1-8
- **Experimental observation of induced stochastic transitions in a multiwall potential of an rf-SQUID loop** / O. G. Turutanov, V. Yu. Lyakhno, and V. I. Shnyrkov // *Low Temperature Physics*, 2014, vol 40, N11, pp. 1026 doi: 10.1063/1.4901990;
- **Features of design and manufacturing of liquid Helium FRP Dewar’s vessels for Magnetic Encephalograph development** / V.Yu. Lyakhno, O.B. Kivirenko, R.V. Varnas, O.A. Mudriy // *Problems of Design&Man. Of Vehicles Constructions*, Kh. Nat. Aerospace Univ. “KhAI”. –2011. – vol. 3(67). pp.63-73.
- V.Yu. Lyakhno, V.I. Shnyrkov, N.N. Budnik **Dewar-Shield for Magnetic Susceptibility Measurements in High Magnetic Fields**, Patent №58271 of Ukraine, MPK F17C 3/00 F17C 13/00 G01R 33/16 G01R 33/035 G01N 27/72. Declar. 01.09.2010; Publ. 11.04.2011, Bul. №7.
- **SQUID Magnetometer for Structuroscopy of Structural Materials** / A.V.Fedorchenko, V.Yu. Lyakhno, V.I. Shnyrkov // *Problems of Atomic Science and Technology*. 2010, №1(65), p.150-156
- **FRP Dewar for Measurements in High Pulsed Magnetic Fields** / V.Yu. Lyakhno, A.V.Fedorchenko, O.B. Kivirenko, V.I. Shnyrkov // *Cryogenics*, 2009, 49, pp.425-428.
- **Parameters Optimization of the FRP Dewar Intended for Biomagnetic Investigations** / V. Yu. Lyakhno, A. S. Garbuz, L. V. Gnezdilova, A. V. Lopin, and V. I. Shnyrkov // *Instruments and Experimental Techniques*, 2009, vol. 52, No. 5, pp. 752–757.
- **Deposition and Characterization of Few-nanometers-thick Superconducting Mo-Re Films** / Seleznev V. A., Gol'tsman G. N., Lyakhno V. Yu. et al // *Superconductor Science and Technology*, 2008, Vol 21 , N 11, 115006.
- **Random-test multipole analysis of two-body (γ,p) and (γ,n) reactions of 4He nuclear disintegration** / Yu. P. Lyakhno, I. V. Dogyust, E. S. Gorbenko, V. Yu Lyakhno, S. S. Zub // *Nuclear Physics*. - 2007. - A781, vol.3. - P. 306-316.
- **FRP Dewar for Magnetic Microscope Based on HTSC SQUIDs** / V.Yu. Lyakhno, S.I. Melnik, Yu.V. Fomenko, V.I. Shnyrkov // *Radiotekhnica, Kharkov, KNURE*, 2007, №150, c.159-166.
- **In-Depth Profiling X-RAY Photoelectron Spectroscopy Study of NbN and MoRe Ultra-Thin Films** / V. Lyakhno, A. Garbuz, M. Mihailov, et al // *Proc. of Materials Science & Technology 2006 Conference*, symposium “Nanomaterials: Science and Technology”, Cincinnati, USA, October 2006.

- **The Investigation of Low Temperature Vacuum Drying Processes of Agricultural Materials** / L.A. Bazyma, A.V. Basteev, V.P. Guskov, A.M. Lyashenko, V.Yu. Lyakhno, V.A. Kutovoy // Journal of Food Engineering, 2006, Vol 74, Issue 3, pp 410-415.
- **The Plasticity and Strength of Solid Normal Hydrogen Crystal (n-H₂) Doped by the Nitrogen** / L.A. Alekseeva, V.D. Natsik, R.V. Romashkin, L.A. Vachshenko, A.S. Garbuz, V.Yu. Lyakhno // Physics of Solid State, 2006, Vol 48, N8, pp.1513-1520.
- **Pulse Plasma Acceleration Using to Deposit Coating on the Dielectric Materials** / V.Yu. Lyakhno, V.V. Kolesnik, A.K. Gnap, Ye.F. Khramov // Mod. Prob. of Hum.&Horm. of Management. Mat. of 3 Int. Interdisciplinary Scien.-Practical Conf./ Kharkov, Kharkov Nat. Univ., 2002, pp.97-98.
- **“Design of Plasma Technology Installation “Pulse”. Specularities of Pulse Deposition Methods”**/ Rashkovan V.M., Soloviev.V.V., Lyakhno V.Yu. // Studying Mat. for Laboratory Expressions, National Aerospace University “KhAI”, 2002.
- **Obtaining of Multicomponent Films in Discharge of Pulse Conversion Plasma Accelerator**, Lyakhno V.Yu., Sinchenko A.V., Problems of Space Science and Technology, Proc. of International Conf. of Young Scien., CAGI, Moscow, 2000.
- **ZrO thin film production by the cathode sputtering** / V. Rashkovan, Ch. Falco, V. Lyakhno, V. Novosad et al. /“Aero-Space Technique and Technology”, issue 7, 1998, p.110.
- **Magnetic System of Space Object Coupling** /Rashkovan V.M., Novosad V.A., Pignastiy O.M., Zub S.S., Lyakhno V.Yu. // Proc. of 4-th Inter. Conference of new technologies in machine building. - Kharkov. 1996.