

Vladimir Pomjakushin

Curriculum Vitae

Personal information

Family name: Pomjakushin (or Pomyakushin), (or Pomiakouchine)
Full name: Vladimir Yur'evich Pomjakushin
Place and date of birth: Magdeburg, Germany, July 19, 1964
Marital status: Married, daughter, son (both 1989)
Citizenships: Switzerland, Russia
Languages: Russian (mother tongue), English, German
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Education

1992 **Ph.D** in Physics (Condensed Matter), Joint Institute for Nuclear Research (JINR), Dubna, Russia. Thesis advisor: [Isai I. Gurevich](#), Kurchatov Institute (KI), Moscow
-1991 Postgraduate study, Moscow Institute of Physics and Technology ([MIPT](#)) and Kurchatov Institute, Moscow
1987 **M.S.** in Physics, General and Applied Physics department, MIPT and KI, Moscow. Diploma advisor: Dr. Alexandr N. Ponomarev, KI, Moscow

Appointments

2008-present Senior research scientist, responsible for the high resolution diffractometer [HRPT](#), Laboratory for Neutron Scattering and Imaging ([LNS](#)), Paul Scherrer Institute (PSI)
2004-2008 Senior research scientist, responsible for the high resolution diffractometer HRPT, LNS, ETHZ Zurich and PSI
2002-2004 Research scientist, responsible for HRPT, Laboratory for Neutron Scattering (LNS), ETHZ and PSI
2000-2002 Senior research scientist, head of the group, responsible for the high resolution Fourier diffractometer ([HRFD FDVR-rus](#)), I.M.Frank Laboratory of Neutron Physics, Joint Institute for Nuclear Research ([JINR](#)), Dubna, Russia
1999-2000 postdoctoral position, co-responsible for the powder diffraction instruments DMC and HRPT at the Laboratory for Neutron Scattering, ETHZ & PSI, Villigen PSI, Switzerland
1996-1999 Senior research scientist, responsible for the HRFD-diffractometer, [I.M.Frank](#) Laboratory of Neutron Physics, Joint Institute for Nuclear Research (JINR), Dubna, Russia
1993-1996 Research scientist, [V.P. Dzhelepov](#) Laboratory for Nuclear Problems ([DLNP](#)), JINR, Dubna, Russia (muon spin spectroscopy group MSG of Dr. Vasilii A. Zhukov)
1988-1993 Junior research scientist, ÊMSG, DLNP, JINR, Dubna, Russia
1987-1988 Junior research associate, Laboratory of Muon Physics ([Prof. Boris A. Nikolskii](#)¹), Kurchatov Institute, Russia

¹one of the founder of μ SR, together with I. Ivanter, V. Smilga et al

Other professional activity

- 2011-2018, 2023- Member of IUCr Commission on Magnetic Structures CMS established by the Executive Committee in 2011 (<https://www.iucr.org/iucr/commissions/magnetic-structures>)
- 2002-present External users support in the diffraction experiments and data analysis, HRPT/SINQ, PSI
- 2002-present [Physik-Praktikum](#) für Vorgerückte an der ETH Zürich
- 2006 Chairperson, “Neutron diffraction” Microsimposium, European Powder Diffraction Conference, EPDIC-10, Geneva
- 2003-2004 Co-ordinator, Theme: “Colossal Magnetoresistance Manganites and Cobaltates”, Workshop on “LNS research themes 2003,2004 and beyond”, Klosters
- 2003 Member, International Scientific Advisory Committee and Selection panel, Budapest Neutron center (BNC), Hungary
- 2001 Organizing Committee, Meeting in frame of SNSF-SCOPE Joint Research Project “Neutron Diffraction and μ SR Study of Phase Separation Phenomenon in Complex Magnetic Oxides”, May 31-June 1, Dubna
- 2000-2003 Co-ordinator from the Russian side, SNSF/SCOPE Project (JINR-Moscow State Univ-ETHZ-PSI)
- 1999 Member, International Advisory Committee on Muon Spin Rotation
- 1996-1998 Co-ordinator from the Russian side, SNSF/CEEC/NIS Project (JINR-KI-ETHZ-PSI)
- 1994 Organizing Committee, [Third International Symposium on Muon and Pion Interactions with Matter](#), 18–21 October, 1994, Dubna, Russia

Scientific expertise, interests

Determination and description of the crystal and magnetic structures and their underlying symmetries with the use of magnetic Shubnikov and super-space groups and representation (multi)-k vector formalism. Neutron and synchrotron x-ray diffraction studies of the structures using the above symmetry arguments. Study of the local magnetic field distribution and its dynamics by means of muon spin rotation/relaxation technique [e.g. local spin configurations in (anti)ferromagnetics, flux lattice in superconductors].

Some of recent research directions are (1) multi-k structures by symmetry allowing interesting consequences, e.g., skyrmion formation and the presence of secondary order parameters; (2) quasi-1D dimensional quantum magnets; (3) multiferroic and charge ordered materials with the symmetry dictated coupling between spin and lattice; (4) magnetic and superconducting iron chalcogenides.

Development and maintenance of the experimental facilities for powder neutron diffraction: high resolution powder diffractometer HRPT/SINQ (www.psi.ch/sinq/hrpt); time-of-flight high resolution Fourier diffractometer HRFD/IBR2, Dubna ([HRFD FDVR-rus](#)).

Selected publications ([Full list](#))

1. V. Yu. Pomjakushin, A. Podlesnyak, A. Furrer, and E. V. Pomjakushina, “Long-range three-dimensional magnetic structures of the spin $s = 1$ hexamer cluster fedotovite-like $A_2Cu_3O(SO_4)_3$ ($A_2 = K_2, NaK, Na_2$): A neutron diffraction study,” *Physical Review B*, vol. 109, no. 14, Apr. 12, 2024. [doi:10.1103/PhysRevB.109.144409](https://doi.org/10.1103/PhysRevB.109.144409).
2. V Pomjakushin, I. Plokhikh, J. S. White, Y. Fujishiro, N. Kanazawa, Y. Tokura, and E. Pomjakushina. Topological magnetic structures in MnGe: Neutron diffraction and symmetry analysis. *PHYSICAL REVIEW B*, 107(2), JAN 12 2023. [doi:10.1103/PhysRevB.107.024410](https://doi.org/10.1103/PhysRevB.107.024410).
3. Pascal Puphal, Vladimir Pomjakushin, Naoya Kanazawa, Victor Ukleev, Dariusz J. Gawryluk, Junzhang Ma, Muntaser Naamneh, Nicholas C. Plumb, Lukas Keller, Robert Cubitt, Ekaterina Pomjakushina, and Jonathan S. White. Topological Magnetic Phase in the Candidate Weyl Semimetal CeAlGe. *Phys. Rev. Lett.*, 124:017202, Jan 2020. URL: <https://link.aps.org/doi/10.1103/PhysRevLett.124.017202>, [doi:10.1103/PhysRevLett.124.017202](https://doi.org/10.1103/PhysRevLett.124.017202).
4. F. Li, V. Pomjakushin, T. Mazet, R. Sibille, B. Malaman, R. Yadav, L. Keller, M. Medarde, K. Conder, and E. Pomjakushina. “Revisiting the magnetic structure and charge ordering in $La_{1/3}Sr_{2/3}FeO_3$ by neutron powder diffraction and Mossbauer spectroscopy”. *Physical Review B*, 97(17), 2018. [doi:10.1103/PhysRevB.97.174417](https://doi.org/10.1103/PhysRevB.97.174417).
5. A. Furrer, A. Podlesnyak, E. Pomjakushina, and V. Pomjakushin. “Effect of Sr doping on the magnetic exchange interactions in manganites of type $La_{(1-x)}Sr_xMn_yA_{(1-y)}O_3$ ($A = Ga, Ti; 0.1 \leq y \leq 1$)”. *Physical Review B*, 95(10), 2017. [doi:10.1103/PhysRevB.95.104414](https://doi.org/10.1103/PhysRevB.95.104414).

6. E. Pomjakushina, V. Pomjakushin, K. Rolfs, J. Karpinski, and K. Conder. “New Synthesis Route and Magnetic Structure of Tm₂Mn₂O₇ Pyrochlore”. *Inorganic Chemistry*, 54(18):9092–9097, 2015. doi:[10.1021/acs.inorgchem.5b01498](https://doi.org/10.1021/acs.inorgchem.5b01498).
7. A. Fennell, V. Y. Pomjakushin, A. Uldry, B. Delley, B. Prevost, A. Desilets-Benoit, A. D. Bianchi, R. I. Bewley, B. R. Hansen, T. Klimczuk, R. J. Cava, and M. Kenzelmann, “Evidence for SrHo₂O₄ and SrDy₂O₄ as model J(1)-J(2) zigzag chain materials,” *PHYSICAL REVIEW B*, vol. 89, JUN 17 2014, doi:[10.1103/PhysRevB.89.224511](https://doi.org/10.1103/PhysRevB.89.224511)}.
8. V. Pomjakushin, “Full propagation-vector star antiferromagnetic order in quantum spin trimer system Ca₃CuNi₂(PO₄)₄”, *J. Phys.: Condens. Matter* 26 496002 (2014), doi:[10.1088/0953-8984/26/49/496002](https://doi.org/10.1088/0953-8984/26/49/496002) }
9. V Yu Pomjakushin, A Krzton-Maziopa E V Pomjakushina, K Conder, D Chernyshov, V Svitlyk and A Bosak “Intrinsic crystal phase separation in the antiferromagnetic superconductor Rb_yFe_{2-x}Se₂: a diffraction study”, *J. Phys.: Condens. Matter* 24 435701 (2012), doi:[10.1088/0953-8984/24/43/435701](https://doi.org/10.1088/0953-8984/24/43/435701) }
10. V. Yu. Pomjakushin, D. V. Sheptyakov, E. V. Pomjakushina, A. Krzton-Maziopa, K. Conder, D. Chernyshov, V. Svitlyk, and Z. Shermadini, “Iron-vacancy superstructure and possible room-temperature antiferromagnetic order in superconducting Cs_yFe_{2-x}Se₂”, *Phys. Rev. B* 83, 144410 (2011), doi:[10.1103/PhysRevB.83.144410](https://doi.org/10.1103/PhysRevB.83.144410)}; “Room temperature antiferromagnetic order in superconducting X_yFe_{2-x}Se₂ (X = Rb, K): a neutron powder diffraction study”, *J. Phys.: Condens. Matter* 23 (2011), doi:[10.1088/0953-8984/23/15/156003](https://doi.org/10.1088/0953-8984/23/15/156003) }.
11. V. Yu Pomjakushin, D. V. Sheptyakov, E. V. Pomjakushina, K. Conder, and A. M. Balagurov. Evidence for the strong effect of quenched correlated disorder on phase separation and magnetism in (La_{1-y}Pr_y)(0.7)Ca_{0.3}MnO₃. *JOURNAL OF PHYSICS-CONDENSED MATTER*, 22(11), MAR 24 2010. doi:[10.1088/0953-8984/22/11/115601](https://doi.org/10.1088/0953-8984/22/11/115601) }.
12. J. S. Zhou, J. A. Alonso, V. Pomjakushin, J. B. Goodenough, Y. Ren, J. Q. Yan, and J. G. Cheng, “Intrinsic structural distortion and superexchange interaction in the orthorhombic rare-earth perovskites RCrO₃,” *PHYSICAL REVIEW B*, vol. 81, JUN 18 2010, doi:[10.1103/PhysRevB.81.214115](https://doi.org/10.1103/PhysRevB.81.214115) }.
13. E. Pomjakushina, K. Conder, V. Pomjakushin, M. Bendele, and R. Khasanov, “Synthesis, crystal structure, and chemical stability of the superconductor” FeSe_{1-x}, *Phys. Rev. B* 80, 024517 (2009), doi:[10.1103/PhysRevB.80.024517](https://doi.org/10.1103/PhysRevB.80.024517) }.
14. V. Yu. Pomjakushin, M. Kenzelmann, A. Doenni, A.B. Harris, T. Nakajima, S. Mitsuda, M. Tachibana, L. Keller, J. Mesot, H. Kitazawa and E. Takayama-Muromachi, “Evidence for large electric polarization from collinear magnetism in TmMnO₃”, *New Journal of Physics* vol. 11, 043019 (2009), doi:[10.1088/1367-2630/11/4/043019](https://doi.org/10.1088/1367-2630/11/4/043019) }
15. M. Garcia-Fernandez, U. Staub, Y. Bodenthin, V. Scagnoli, V. Pomjakushin, S. W. Lovesey, A. Mirone, J. Herrero-Martin, C. Piamonteze, and E. Pomjakushina, “Orbital Order at Mn and O Sites and Absence of Zener Polaron Formation in Manganites,” *PHYSICAL REVIEW LETTERS*, vol. 103, AUG 28 2009, doi:[10.1103/PhysRevLett.103.097205](https://doi.org/10.1103/PhysRevLett.103.097205) }.
16. V. Y. Pomjakushin, A. Furrer, D. V. Sheptyakov, E. V. Pomjakushina, and K. Conder, “Crystal and magnetic structures of the spin-trimer compounds Ca₃Cu_{3-x}Ni_x(PO₄)₄ (x=0,1,2),” *Phys. Rev. B*, vol. 76, pp. 174433-1–9, 2007, doi:[10.1103/PhysRevB.76.174433](https://doi.org/10.1103/PhysRevB.76.174433) }.
17. V. Y. Pomjakushin, D. V. Sheptyakov, K. Conder, E. V. Pomjakushina, and A. M. Balagurov, “Effect of oxygen isotope substitution and crystal microstructure on magnetic ordering and phase separation in (La_{1-y}Pr_y)_{0.7}Ca_{0.3}MnO₃,” *Phys. Rev. B*, vol. 75, no. 5, pp. 054410–1–12, 2007, doi:[10.1103/PhysRevB.75.054410](https://doi.org/10.1103/PhysRevB.75.054410) }.
18. P. Fischer, V. Pomjakushin, D. Sheptyakov, L. Keller, M. Janoschek, B. Roessli, J. Schefer, G. Petrakovskii, L. Bezmaternikh, V. Temerov, and D. Velikanov, “Simultaneous antiferromagnetic Fe³⁺ and Nd³⁺ ordering in NdFe₃(BO₃)₄,” *Journal of Physics-Condensed Matter*, vol. 18, pp. 7975–7989, 2006, doi:[10.1088/0953-8984/18/34/010](https://doi.org/10.1088/0953-8984/18/34/010) }.
19. S. Klotz, T. Strassle, G. Rouse, G. Hamel, and V. Pomjakushin, “Angle-dispersive neutron diffraction under high pressure to 10 GPa,” *Applied Physics Letters*, vol. 86, p. 031917, 2005, doi:[10.1063/1.1855419](https://doi.org/10.1063/1.1855419) }.

20. V. Y. Pomjakushin, A. M. Balagurov, T. V. Elzhov, D. V. Sheptyakov, P. Fischer, D. I. Khomskii, V. Y. Yushankhai, A. M. Rozova, M. G. Abakumov, E. V. Antipov, M. V. Lobanov, and S. Billinge, “Atomic and magnetic structures, disorder effects, and unconventional superexchange interactions in A_2MnGaO_{5+y} ($A=Sr,Ca$) oxides of layered brownmillerite-type structure,” *Physical Review B*, vol. 66, p. 184412, 2002, doi:{10.1103/PhysRevB.66.184412}.
21. A. Lappas, V. Alexandrakis, J. Giapintzakis, V. Pomjakushin, K. Prassides, and A. Schenck, “Impurity-induced antiferromagnetic order in the Haldane-gap compound $PbNi_{2-x}Mg_xV_2O_8$ ($x = 0.24$),” *Physical Review B*, vol. 66, p. 014428, 2002, doi:{10.1103/PhysRevB.66.014428}.
22. A. M. Balagurov, V. Y. Pomjakushin, D. V. Sheptyakov, V. L. Aksenov, P. Fischer, L. Keller, O. Y. Gorbenko, A. R. Kaul, and N. A. Babushkina, “Long-scale phase separation versus homogeneous magnetic state in $(La_{1-y}Pr_y)_{0.7}Ca_{0.3}MnO_3$: A neutron diffraction study,” *Physical Review B*, vol. 64, pp. 024420–1–024420–10, 2001.
23. V. Pomjakushin, A. Balagurov, E. Raspopina, V. Sikolenko, A. Griбанov, A. Schenck, A. Amato, U. Zimmermann, and I. Lyubutin, “Modulated magnetic structure of $U(Pd_{1-x}Fex)(2)Ge-2$ studied by μ SR,” *JOURNAL OF PHYSICS-CONDENSED MATTER*, vol. 12, pp. 7969–7981, SEP 11 2000, doi:{10.1088/0953-8984/12/36/311}.
24. A. M. Balagurov, V. Y. Pomjakushin, D. V. Sheptyakov, V. L. Aksenov, N. A. Babushkina, L. M. Belova, A. H. Taldenkov, A. V. Inyushkin, P. Fischer, M. Gutmann, L. Keller, O. Y. Gorbenko, and A. R. Kaul, “Effect of oxygen isotope substitution on the magnetic structure of $(La_{0.25}Pr_{0.75})_{0.7}Ca_{0.3}MnO_3$,” *Physical Review B*, vol. 60, pp. 383–7, 1999, doi:{10.1103/PhysRevB.60.383}.
25. V. Y. Pomjakushin, A. A. Zakharov, A. M. Balagurov, F. N. Gygax, A. Schenck, A. Amato, D. Herlach, A. I. Beckrovnny, V. N. Duginov, Y. V. Obukhov, A. N. Ponomarev, and S. N. Barilo, “Microscopic phase separation in La_2CuO_{4+x} induced by the superconducting transition,” *Physical Review B*, vol. 58, pp. 12350–4, 1998, doi:{10.1103/PhysRevB.58.12350}.
26. V. Y. Pomjakushin, V. N. Duginov, V. G. Grebinnik, B. F. Kirillov, T. N. Mamedov, V. G. Olshevsky, A. V. Pirogov, A. N. Ponomarev, and V. A. Zhlukov, “Nonzero initial muon precession phase in AF La_2CuO_{4-y} ,” *Hyperfine Interactions*, vol. 85, pp. 305–310, 1994, doi:{10.1007/BF02069439}.
27. V. Storchak, B. F. Kirillov, A. V. Pirogov, V. N. Duginov, V. G. Grebinnik, A. B. Lazarev, V. G. Ol’shevsky, V. Y. Pomyakushin, S. N. Shilov, and V. A. Zhukov, “On the nature of the muon complex in condensed oxygen,” *Physics Letters A*, vol. 166, pp. 429–32, 1992, doi:{10.1016/0375-9601(92)90737-7}.
28. V. G. Olshevsky and V. Y. Pomjakushin, “Use of UNIX on the controlling computer of the MUSPIN μ SR instrument” *Communication of the Joint Institute for Nuclear Research*, P10-94-416, Dubna, 1994, (pdf), (JINR lib).
29. E. I. Kornilov and V. Y. Pomjakushin, “On a generalization of the Kubo-Toyabe formula,” *Physics Letters A*, vol. 153, pp. 364–7, 1991, doi:{10.1016/0375-9601(91)90959-C}, local copy.