

CURRICULUM VITAE

Dr. Alevtina Smekhova (Russian citizenship)

WORK ADDRESS:

Peter Grünberg Institut (PGI-6),
Forschungszentrum Jülich, 52425, Jülich
c/o Helmholtz-Zentrum Berlin (BESSY II)
Albert-Einstein-Str. 15, 12489 Berlin



WORK PHONE: +49 30 8062 14779

E-mails:

a.smekhova (at) fz-juelich.de;
smeal (at) physics.msu.ru;
alevtina.smekhova (at) gmail.com;

ORCIDiD: 0000-0003-0946-2909

HIGHER EDUCATION:

- January 2001: graduated from M.V. Lomonosov Moscow State University (Faculty of Physics, chair of General Physics and Wave Process, “laser physics and nonlinear optics” specialization) with gold diploma;
April 2006: PhD thesis with a specialization in “condensed matter physics” and a title “The development of resonant X-ray reflectivity method near the $L_{2,3}$ absorption edges for investigations of magnetic multilayers” has been defended

PROFESSIONAL BACKGROUND:

- since 05/2015 post-doctoral scientist in Borderline Magnetism group at Peter Grünberg Institute of Forschungszentrum Jülich (PGI-6, Berlin branch at the HZB-BESSY II), Berlin;
- 04/2014 – 04/2015: post-doctoral scientist at University Duisburg-Essen (Fakultät für Physik, Experimentalphysik, AG Wende und CENIDE), Duisburg, Germany;
- during 2014: visiting scientist at the Laboratory of Magnetism of Low Dimension Systems (January-March, 2 months, L’IMPMC (UPMC, CNRS), Paris, France) within “Research in Paris 2013” program;
- during 2013: visiting scientist at the HZDR (April, 3 weeks, and November, 4 weeks Dresden, Germany) and DESY synchrotron (July-August, 2 months, Hamburg, Germany) within “Vladimir Vernadsky” MSU-DAAD Program;
- during 2012: visiting scientist (9 weeks) at the Helmholtz-Zentrum Dresden-Rossendorf (HZDR, Germany) at the Ion Beam Center as a PI of joint Helmholtz-Russia grant “Defects in magnetic TiO_2 ” (DETI.2) (Joint Research Group HRJRG-314 & the Russian Foundation for Basic Research, RFBR #12-02-91321-SIG_a; <http://magn.ru/Rus/DETI2/index.htm>; within the scientific call for joint Russian (RFBR) - German (Helmholtz Association) grants in 2011);
- since March 2010: senior researcher at the Chair of Solid State Physics, Faculty of Physics; Lomonosov Moscow State University (permanent position);
- 2007 – 2010: post-doctoral scientist at the European Synchrotron Radiation Facility (Electronic Structure & Magnetism group, ID12 beamline) in Grenoble (France);
- 2006 – 2007: researcher at the Chair of Solid State Physics, Moscow State University, Moscow (Russia);
- 2004 – 01/2006: postgraduate student at the Chair of Solid State Physics. Research in the field of resonant magnetic Bragg reflectivity (at absorption edges) from magnetic multilayers (theory and computer modeling). PhD thesis was defended in April of 2006;
- 2001 – 2002: postgraduate student at the Chair of General Physics and Wave Process, but postgraduate program was suspended by external reasons

FIELDS OF SCIENTIFIC INTERESTS:

Element-specific spectroscopies with synchrotron radiation (absorption, emission and reflection); magnetic and electronic properties of thin films and nanostructures; X-Ray magnetic circular dichroism (XMCD) technique itself and its application for studies of interfaces and induced magnetic moments of initially non-magnetic atoms; spintronics, molecular magnets, properties of nanoclusters, DMS, multiferroics, magnetic superconductors, core-shell magnetic nanoparticles, Positron Annihilation Spectroscopy (PAS) for defects detection, ferromagnetism induced by ion irradiation

HONORIES:

- The diploma for the best report at the XII International conferences of students and young scientists on fundamental sciences “Lomonosov – 2005”. Moscow. MSU. Russia. 2005;
- The 3rd degree diploma at the 2nd All-Russian youth scientific school “Micro-, nanotechnology and its applications”. Chernogolovka. IPTM RAS. Russia. 2005;
- The award of the MSU rector grant on 2007 & 2011;
- The 1st young scientist prize of 45th PNPI School on Condensed State Physics “CSP – 2011” (St.Petersburg region, Russia)

LIST OF PUBLICATIONS (starting from 2008):

1. *M.A. Andreeva, A.G. Smekhova*, "X-ray magneto-optics based on synchrotron radiation", *Izvestiya Rossiiskoi Akademii Nauk. Seriya Fizicheskaya* 72 (5), p.693 (2008) (in Russian); *M. A. Andreeva, A.G. Smekhova*, "X-ray magneto-optics based on synchrotron radiation", ***Izvestiya RAS*** 72 (5), p.656 (2008) (in English)
2. *A. Smekhova, D. Ciuculescu, P. Lecante, F. Wilhelm, C. Amiens, A. Rogalev, B. Chaudret*, "XMCD Studies of FeRh Nanoparticles", ***Magnetics, IEEE Transactions on***, 44, pp.2776-2779 (2008)
3. *A.F. Orlov, A.B. Granovsky, L.A. Balagurov, I.V. Kulemanov, Yu.N. Parkhomenko, N.S. Perov, E.A. Gan'shina, V.T. Bublik, K.D. Shcherbachev, A.V. Kartavykh, V.I. Vdovin, A. Sapelkin, V.V. Saraikin, Yu.A. Agafonov, V.I. Zinenko, A. Rogalev, A. Smekhova*, "Structure, electrical and magnetic properties, and the origin of room temperature ferromagnetism in the Mn-implanted Si", *JETP* 136 (4), pp.703-710, (2009) (in Russian); ***JETP*** 109 (4), pp.602-608 (2009) (English version)
4. *A. Smekhova, N. Atamena, D. Ciuculescu, P. Lecante, F. Wilhelm, C. Amiens, A. Rogalev*, "XANES and XMCD studies of core-shell FeRh and CoRh nanoparticles", ***J. of Physics.: Conference Series*** 200, p.072091 (2010)
5. *D. Ciuculescu, N. Atamena, A. Smekhova, F. Wilhelm, A. Rogalev, G. Alcaraz, B. Chaudret, P. Lecante, R.E. Benfield, C. Amiens*, "Organometallic control at the nanoscale: a new, one-pot method to decorate a magnetic nanoparticle surface with noble metal atoms", ***Chem. Commun.*** 46, p.2453 (2010)
6. *C. Carvallo, Ph. Sainctavit, M.-A. Arrio, Y. Guyodo, R.L. Penn, B. Forsberg, A. Rogalev, F. Wilhelm, and A. Smekhova*, "Self-reversal of magnetization in oceanic submarine basalts studied with XMCD", ***Geophys. Res. Lett.*** 37, p.L11306 (2010)
7. *A. Smekhova, M. Andreeva, E. Odintsova, C. Dufour, K. Dumesnil, F. Wilhelm, A. Rogalev*, "Determination of the magnetic contribution to YFe₂ susceptibility by means of X-Ray Resonant Magnetic Reflectivity", *Crystallography Reports*, 55 (5), p. 906–915 (2010) (in Russian); ***Crystallography Reports*** 55 (5), pp.854-862 (2010) (English version)
8. *P. Wadley, A. A. Freeman, K. W. Edmonds, G. van der Laan, J. S. Chauhan, R. P. Campion, A. W. Rushforth, B. L. Gallagher, C. T. Foxon, F. Wilhelm, A. G. Smekhova, and A. Rogalev*, "Element-resolved orbital polarization in (III,Mn)As ferromagnetic semiconductors from K-edge x-ray magnetic circular dichroism", ***Phys. Rev. B*** 81, p.235208 (2010)
9. *M. Ungureanu, K. Dumesnil, C. Dufour, N. Gonzalez, F. Wilhelm, A. Smekhova, A. Rogalev*, "Using an original Zero-Magnetization Ferromagnet as pinning layer in exchange-bias systems", ***Phys. Rev. B*** 82, p.174421 (2010)
10. *A.F. Orlov, L.A. Balagurov, I.V. Kulemanov, N.S. Perov, E.A. Gan'shina, L.V. Fetisov, A. Rogalev, A. Smekhova, J.C. Cezar*, "Intrinsic ferromagnetism in a semiconductor Ti_{1-x}Co_xO_{2-δ} created by oxygen vacancies injection", *Physics of the Solid State* 53, p.452 (2011) (in Russian); ***Physics of the Solid State*** 53 (3), pp.482-484 (2011) (in English)
11. *S. Brossard, F. Volatron, L. Lisnard, M.-A. Arrio, L. Catala, C. Mathoniere, T. Mallah, Ch. C. dit Moulin, A. Rogalev, F. Wilhelm, A. Smekhova, and Ph. Sainctavit*, "Investigation of the Photoinduced Magnetization of

- Copper Octacyanomolybdates Nanoparticles by X-ray Magnetic Circular Dichroism”, **J. Am. Chem. Soc.** 134 (1), pp.222-228 (2012)
12. **A. Smekhova**, E. A. Gan'shina, B. S. Roschin, A. D. Gribova, M. A. Andreeva, F. Wilhelm, and A. Rogalev, “Structural and Magnetic Studies of $[\text{Co}_{0.45}\text{Fe}_{0.45}\text{Zr}_{0.1}/\text{a-Si}]_N$ Multilayers”, **Journal of Spintronics and Magnetic Nanomaterials** 1 (1), pp.11-17 (2012)
 13. A. Granovsky, A. Orlov, N. Perov, E. Gan'shina, A. Semisalova, L. Balagurov, I. Kulemanov, A. Sapelkin, A. Rogalev, and **A. Smekhova**, “Above Room Temperature Ferromagnetism in Si:Mn and $\text{TiO}_{2-\delta}\text{:Co}$ ”, **Journal of Nanoscience and Nanotechnology** 12, pp.7540-7544 (2012)
 14. A.F. Orlov, L.A. Balagurov, I.V. Kulemanov, E.A. Petrova, N.S. Perov, E.A. Gan'shina, L.Yu. Fetisov, A.S. Semisalova, A.I. Novikov, L.V. Yashina, A. Rogalev, **A. Smekhova**, A.V. Lashkul, E. Lahderanta, "Magnetic and magneto-optical properties of $\text{Ti}_{1-x}\text{V}_x\text{O}_{2-\delta}$ semiconductor oxide films: room-temperature ferromagnetism versus resistivity, **SPIN** 2 (2), p.1250011 (6 pages) (2012)
 15. **A. Smekhova**, L.N. Fomicheva, A.V. Tsvyashchenko, V.A. Sidorov, A. Rogalev, “New ternary boride EuRh_4B_4 synthesized under high pressure-temperature conditions”, **Solid State Phenomena** 190, pp.421-424 (2012)
 16. M. Butterling, W. Anwand, S. Cornelius, K. Potzger, **A. Smekhova**, M. Vinnichenko and A. Wagner, "Optimization of growth parameters of TiO_2 thin films using a slow positron beam", **Journal of Physics: Conference Series** 443, p.012073 (2013)
 17. O. Yildirim, M. Butterling, S. Cornelius, Yu. Mikhailovskiy, A. Novikov, A. Semisalova, A. Orlov, E. Gan'shina, N. Perov, W. Anwand, A. Wagner, K. Potzger, A.B. Granovsky and **A. Smekhova**, "Ferromagnetism and structural defects in V-doped titanium dioxide", **PSS(c)** 11, p.1106 (2014)
 18. E.A. Tereshina, O. Isnard, **A. Smekhova**, A.V. Andreev, A. Rogalev, S. Khmelevskiy, “Experimental and theoretical study of magnetic ordering and local atomic polarization in Ru-substituted $\text{Lu}_2\text{Fe}_{17}$ ”, **Phys. Rev. B** 89, p.094420 (2014)
 19. Figueroa A.I., Bartolome J., Garc'ia L.M., Bartolome F., Bunau O., Stankiewicz J., Ruiz L., Gonzalez-Calbet J.M., Petroff F., Deranlot C., Pascarelli S., Bencok P., Brookes N.B., Wilhelm F., **Smekhova A.**, Rogalev A., “Structural and magnetic properties of granular Co-Pt multilayers with perpendicular magnetic anisotropy”, **Phys. Rev. B** 90, p.174421 (2014)
 20. A. Semisalova, Y. O. Mikhailovsky, **A. Smekhova**, A.F. Orlov, N.S. Perov, E.A. Gan'shina, A. Lashkul, E. Lähderanta, K. Potzger, O. Yildirim, B. Aronzon, A.B. Granovsky, “Above room temperature ferromagnetism in Co- and V- doped $\text{TiO}_{2-\delta}$ - revealing the different contributions of defects and impurities, **Journal of Superconductivity and Novel Magnetism** 28, p.805 (2015)
 21. M.A. Andreeva, Yu.L. Repchenko, **A.G. Smekhova**, K. Dumesnil, F. Wilhelm, A. Rogalev, “Asymmetric diffraction as a method of determining the magneto-optical constants for the X-ray absorption near edge”, **JETP** 147, p.1128 (2015) (in Russian) and **JETP** 120, pp.974-981 (2015) (in English)
 22. Yildirim O., Cornelius S., **Smekhova A.**, Zhukov G., Gan'shina E.A., Granovsky A.B., Huebner R., Baetz C., Potzger K., “The local environment of cobalt in amorphous, polycrystalline and epitaxial anatase $\text{TiO}_2\text{:Co}$ films produced by cobalt ion implantation”, **J. Appl. Phys** 117, p.183901 (2015)
 23. Liedke M.O., Anwand W., Bali R., Cornelius S., Butterling M., Trinh T.T., Wagner A., Salamon S., Walecki D., **Smekhova A.**, Wende H., Potzger K., “Open volume defects and magnetic phase transition in $\text{Fe}_{60}\text{Al}_{40}$ transition metal aluminide”, **J. Appl. Phys** 117, p.163908 (2015)
 24. O. Yildirim, S. Cornelius, M. Butterling, W. Anwand, A. Wagner, **A. Smekhova**, J. Fiedler, R. Böttger, C. Bähz, K. Potzger, “From a non-magnet to a ferromagnet: Mn^+ implantation into different TiO_2 structures”, **Appl. Phys. Lett.** 107, p.242405 (2015)
 25. A.S. Semisalova, A. Orlov, **A. Smekhova**, E. Gan'shina, N. Perov, W. Anwand, K. Potzger, E. Lähderanta, and A. Granovsky, “Above Room Temperature Ferromagnetism in Dilute Magnetic Oxide Semiconductors“, in **Novel Functional Magnetic Materials, Springer Series in Materials Science** (A. Zhukov (ed.), 231, pp.187-219, Springer International Publishing Switzerland 2016
 26. O. Yildirim, S. Cornelius, **A. Smekhova**, M. Butterling, W. Anwand, A. Wagner, C. Bähz, R. Böttger, K. Potzger, “Threshold concentration for ion implantation-induced Co nanocluster formation in $\text{TiO}_2\text{:Co}$ thin films”, **Nucl. Instr. Meth. in Phys. Res. B** 389, pp.13-16 (2016)

27. *F. Huttmann, D. Klar, N. Atodiresei, C. Schmitz-Antoniak, A. Smekhova, A.J. Martínez-Galera, V. Caciuc, G. Bihlmayer, S. Blügel, Th. Michely, and H. Wende*, “Magnetism in a Graphene - 4f - 3d Hybrid System”, **Phys. Rev. B** 95, p.075427 (2017)
28. *E. La Torre, A. Smekhova, C. Schmitz-Antoniak, K. Ollefs, B. Eggert, B. Cöster, D. Walecki, F. Wilhelm, A. Rogalev, J. Lindner, R. Bali, R. Banerjee, B. Sanyal, and H. Wende*, “Local probe of irradiation induced structural changes and orbital magnetism in Fe₆₀Al₄₀ thin films via order-disorder phase transition”, **Phys. Rev. B** 98, p.024101 (2018)
29. *M. Stuckart, N. Izarova, J. van Leusen, A. Smekhova, C. Schmitz-Antoniak, H. Bamberger, J. van Slageren, B. Santiago-Schübel, P. Kögerler*, “Host-Guest-Induced Environment Tuning of 3d Ions in a Polyoxopalladate Matrix”, **Chem. Eur. J.**, 24, 17767 (2018)
30. *C. Schmitz-Antoniak, N.V. Izarova, N. Svechkina, A. Smekhova, M. Stuckart, D. Schmitz and P. Kögerler*, “Polyoxopalladates as prototype molecular hydrogen uptake systems and novel in situ hydrogen detectors at the nanoscale”, **Eur. J. Inorg. Chem.**, accepted (2018), doi:10.1002/ejic.201800972
31. *A. Smekhova, D. Schmitz, N. Izarova, M. Stuckart, S. F. Shams, K. Siemensmeyer, P. Kögerler, C. Schmitz-Antoniak*, “Dimensional crossover from 2D diamagnetism to 3D paramagnetism of Pd ions probed by soft x-rays”, to be submitted
32. *A. Dobrynin, Y. Du, S. Hassan, A. Smekhova and D. O'Donnell*, “Ion Etch Induced Reduction of Exchange Bias in IrMn/CoFe Bilayers”, to be submitted
33. *A. Smekhova, E. La Torre, Th. Szyjka, K. Ollefs, B. Eggert, B. Cöster, F. Wilhelm, R. Bali, J. Lindner, A. Rogalev, D. Többens, E. Weschke, C. Schmitz-Antoniak, and H. Wende*, “Evolution of local environment and rise of Fe spin polarization in Fe₆₀Al₄₀ films induced by Ne⁺ ions”, *New J. Phys.*, to be submitted

Total number of publications: in journals – above (30); in proceedings – 10; abstracts – above 60; as a co-author in books – 1; as a co-author in textbooks – 2. Coordination of bilateral Russian-German projects as a PI (MSU - HZDR) – 1

CERTIFICATE IN THE FIELD OF SYNCHROTRON RADIATION:



TEACHING EXPERIENCE: Two years of teaching at Faculty of Physics (MSU) in the field of “practical” computer science; invited lectures about element-specific X-ray spectroscopies at the 1st Baltic School of Condensed Matter Physics and Magnetism (Kaliningrad, August 2012); thematic lectures about X-ray spectroscopies for the 2nd and 3rd year students at the Faculty of Physics (elective)