CURRICULUM VITAE

OLGA KOCHAROVSKAYA

ADDRESS

Olga Kocharovskaya
University Distinguished Professor,
Distinguished Professor of Physics
Department of Physics and Astronomy,
George Mitchell Bldg., Texas A&M University
College Station, TX 77843-4242
Office: (979) 845-2012
Fax: (979) 458-7931
Email: kochar@physics.tamu.edu

EDUCATION

Dr. Habilitation awarded by the Highest Attestation, 1996
Commission of the Russian Federation

Ph.D. received from the N. N. Lobachevsky State University, 1986
Nizhny Novgorod, Russia

ACADEMIC EXPERIENCE

Texas A&M University, Department of Physics and Astronomy
Distinguished Professor Sept. 2006 – Present
Professor Sept. 2001 – 2006
Associate Professor Jan. 1998 – Sept. 2001

Institute of Applied Physics of the Russian Academy of Sciences
Leading Scientist 1996 – 1998
Senior Scientist 1992 – 1996
Research Scientist 1986 – 1991

Universite Libre de Bruxelles
Visiting Research Scientist, 3 – 6 months per year 1990 – 1996

N. N. Lobachevsky State University, Nizhny Novgorod, Russia
Ph.D. Student 1984 – 1986
Junior Researcher 1978 – 1984

HONORS

The *Sigma Xi* Distinguished Scientist Award, 2012

The University Distinguished Professor, Texas A&M University, 2011

Fellow of the American Physical Society, 2005

With the citation: “For the pioneering works on lasing without inversion, electromagnetically induced transparency and laser control of gamma-ray nuclear transitions.”

The Association of Former Students and Texas A&M University,
Distinguished Achievement Award in Research, 2005

Lecturer in “Distinguished Women Physicists” lecture series,
Department of Physics, the University of Texas at Austin, 2005

Willis Lamb Medal for Laser Physics and Quantum Electronics,
Physics of Quantum Electronics Winter Symposium, 1998

Fellow of the Optical Society of America (OSA), 1997
with the citation: “For the seminal works on lasing without inversion.”

Presidential Award to Outstanding Young,
Doctor of Sciences of the Russian Federation, 1996

GRANTS IN SUPPORT OF RESEARCH (LAST 10 YEARS)

2009 – 2013 – Principal Investigator of the NSF Grant
“Control of atoms-light and nuclei-X-ray photons interactions in solids via quantum interference”
NSF, Total Funding: $380,000.

2006 – 2009 – Principal Investigator of the NSF Grant
“Atomic and Nuclear Interference in Solids”
NSF, Total Funding: $300,000.

2005 – 2008 – Principal Investigator of the AFOSR Grant
“Laser Manipulation of Nuclear Transitions”
Total Funding: $526,946.

2007 – 2009 – Principal Investigator of the U.S. Civilian Research and Development Foundation (CRDF) Cooperative Grants Program
“Coherent Control of the Fundamental Optical Processes in Solids via Atomic Interference”
Total Funding: $63,100 (U.S. Team: $12,620; Russian Team: $50,480).

2005 – 2006 – Principal Investigator of the DURIP AFSOR Grant
“Instrumentation for Laser Manipulation of Nuclear Transitions”
Total Funding: $215,587.

2003 – 2006 – Principal Investigator of the NSF Grant
“Coherent Control of Nuclear Transitions”
NSF, Total Funding: $335,000.

2004 – 2006 – Principal Investigator of the U.S. Civilian Research and Development Foundation (CRDF) Cooperative Grants Program
“Quantum Interference Phenomena with Gamma-Photons in Solids Doped by Mossbauer Nuclei”
Total Funding: $88,382 (U.S. Team $15,000; Russian Team: $73,382).

2001 – 2005 – Co-Principal Investigator of the AFOSR Grant

"Spin-based Lattice-Gas Quantum optics in Solids Using Optical Addressing"
P.I. – Marlan Scully, Total Funding: $1,028,767.

2002 – 2004 – Principal Investigator of the ONR Grant
"Interference Phenomena at Gamma-Ray Nuclear Transitions"
Total Funding: $150,000.
2002 – 2004 – Principal Investigator of the Texas Advanced Research Program Grant
'Multiple Raman Scattering in solids for the new sources of ultra-short pulses"
Total Funding: $150,000.

2001 – 2003 – Principal Investigator of the DARPA Grant
"Mossbauer Gamma-Ray Laser with an Optical Driving"
Total Funding: $283,000.

COLLOQUIA AND SEMINARS (LAST 20 YEARS)

1. Drexel University, Philadelphia, USA, Department of Physics, 1990.
2. Vavilov Optical Institute, St. Petersburg, 1990.
3. Moscow State University, 1990.
4. Universita di Pisa, Italie, Instituto de Fisica, 1990.
5. Bryn Mawr College, USA, Department of Physics, 1991.
6. Universitet P. Et M. Curie, Paris, France, Laboratory de Spectroscopie Hertzienne, 1991.
7. Universita di Pisa, Italie, Instituto de Fisica, 1991.
8. Moscow Theoretical Physics Seminar of Prof. V. L. Ginzburg, Lebedev Institute, 1991.
9. Univeristy of New Mexico, Albuquerque, USA, Center for Advanced Studies, 1992.
10. University of Texas at Dallas, USA, Department of Physics, 1992.
11. Texas A&M University, College Station, USA, Department of Physics, 1992.
12. Kurchatov Institute Of Atomic Energy, Moscow, 1993.
13. North Western University, Evanston, USA, Department of Physics, 1993.
14. Alabama University, Huntsville, USA, Weapon Science Directorat and Physics Department, 1993.
15. University of Oregon, Eugine, USA, Physics Department, August 1993.
16. Imperial College of Science, Technology and Medicine, The Blackett Laboratroy, London, UK, 1994.
17. Stanford University, Edward Ginzton Laboratory, 1995.
18. Texas A&M University, College Station, USA, 1995.
19. Prairie View University, Physics Department, 1995.
20. Jagelonsky University, Krakov, Poland, Institute of Physics, 1995.
21. Universite Libre de Bruxelles, Beligum, 1995.
22. Foundation Louis de Broglie, Paris, France, January 1996.
23. Max Plank Institute for Quantum Optik, Garching, Germany, 1996.
24. Texas A&M University, College Station, 1997.
25. Institute of Applied Physics, Russian Academy of Science, 1998.
26. University of Texas at Austin, Department of Physics, 1998.
27. Old Dominion University, Norfolk, 1999.
28. City College, New York, 1999.
29. Temple University, Philadelphia, 1999.
30. Imperial College , The Blackett Laboratory, London, UK, 2000.
31. Texas A&M University, College Station, 2000.
32. Institute of Applied Physics, Russian Academy of Science, 2001.
33. University of California, Berkeley, AMO, 2002.

34. Niels Bohr Institute and Copenhagen University, Denmark, 2003.
35. University of Texas at Austin, Department of Physics, 2005.
36. University of Texas at Austin, AMO and Condensed Matter, 2005.
37. Oklahoma State University, Department of Physics, 2008.
38. Louisiana State University, Department of Physics, 2008.
39. Louisiana State University, AMO, 2008.
40. Harvard University, Department of Physics and ITAMP, 2008.
41. AMO/Quantum optics Seminar, Texas A&M University, 2010.
42. University of Berkeley, Department of Physics, 2011.
43. Invited speaker at South Central Conference for Undergraduate Women in Physics , Jan. 13-15, 2012, TAMU.

INVITED TALKS AT SCIENTIFIC MEETINGS (LAST 10 YEARS)

1. International Conference "Laser Optics," St. Petersburg, June 1998.
2. 16th International Conference on Coherent and Nonlinear Optics (ICONO), Moscow, July 1998.
3. 29th Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 1999.
4. International Workshop on Novel Optical Materials, TAMU, College Station, Texas, January 1999.
5. International Conference "Laser Physics," Budapest, July 1999.
6. Conference on Coherent Optics, Jackson Hole, July 1999.
7. International Worksship "Modern Trends in Quantum Optics," Munich, Max-Plank Institute for Quantum Optic, June 1999.
8. 30th Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah January 2000.
9. International Workshop on Quantum Control in Atoms, Molecules, Solids and Nuclei, TAMU, College Station, Texas, January 2000.
10. International Workshop on Slow Light, Harvard University, April 2000.
11. International Workshop on Quantum Nucleonics, Leuven University, Belgium, May 2000.
12. EOARD Workshop on Directional Gamma-Ray Induced Emission, London, May 2000.
13. International Mossbauer Conference "Mossbauer Effect: Magnetism, Modern Materials, Gamma Optics," Kazan, July 2000.
14. 31st Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 2001.
15. International Workshop "From Gamma-Ray Optics to Semiconductor Laser Dynamics," Brussels, Belgium, April 2001.
16. 17th International Conference on Coherent and Nonlinear Optics (ICONO), Minsk, Belarus, June 2001.
17. International Conference "Progress in Nonlinear Science," Nizhny Novgorod, July 2001.
18. 22nd Solvay Conference on Physics: The Physics of Communication, Delphi, Greece, November 2001.
19. 32nd Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 2002.
20. International Quantum Electronics Conference (UQEC), Moscow, June 2002.
21. 33rd Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 2003.
22. 34th Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 2004.
23. International Conference "Frontiers of Nonlinear Physics," Nizhny Novgorod, St. Petersburg, July 2004.
24. 35th Winter Colloquium on Physics of Quantum Electronics, Snowbird, Utah, January 2005.
25. Quantum Optics Symposium, TAMU, College Station, Texas, January 2005.
26. AFOSR Workshop on Isomers and Quantum Nucleonics, Dubna, Russia, June 2005.
27. 36th Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2006.

28. International Conference "Coherent Control of the Fundamental Processes in Optics and X-ray Optics," Nizhny, Kazan, July 2006.
29. 11th International Conference on Quantum Optics, Minsk, Belarus, June 2006.
30. TAMU Molecular Physics and Quantum Optics Symposium, invited talk, 2007.
31. International Conference "Frontiers of Nonlinear Physics," Nizhny Novgorod, Saratov, 2007.
32. 16th International Laser Physics Workshop, Leon, Mexico, 2007.
33. 18th International Conference on Coherent and Nonlinear Optics (ICONO), Minsk, May 2007.
34. 37th Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2007.
35. TAMU Workshop on Quantum Coherence, 2007.
36. Princeton-TAMU Symposium on Quantum Mechanics, Informatics and Control, Princeton, March 2007.
37. 38th Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2008.
38. TAMU Physics of Quantum Electronics Symposium, January 2008.
39. Workshop on the storage and manipulation of quantum information in optically-addressed solids, Bozeman, Montana, January 2008.
40. 17th International Laser Physics Workshop, Trondheim, Norway, July 2008.
41. 39th Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2009.
42. TAMU Physics of Quantum Electronics Workshop, January 2009.
43. 18th International Laser Physics Workshop, Barcelona, July 2009.
44. 40th Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2010.
45. TAMU Physics of Quantum Electronics Workshop, January 2010.
46. International Symposium on Optical Manipulation of Quantum Information in Solids, Institute Henri Poincare, May 2010.
47. 19th International Laser Physics Workshop, Iguazu Falls, Brazil, July 2010.
48. International Conference "Frontiers of Nonlinear Physics," Nizhny Novgorod, St. Petersburg, Russia, July 2010.
49. 41st Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2011
50. TAMU Physics of Quantum Electronics Workshop, January, 2011
51. 20th International Laser Physics Workshop, Sarajevo, Bosnia, Herzegovina, July 2011.
52. 1st International Conference on Quantum Technologies, Moscow, July 2011.
53. 42nd Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2012.
54. TAMU Physics of Quantum Electronics Workshop, January 2012.
55. 21st International Laser Physics Workshop, Calgary, Canada, July 2012.
56. 43d Winter Colloquium Physics of Quantum Electronics, Snowbird, Utah, January 2013.
57. TAMU Physics of Quantum Electronics Workshop, January, 2013.

TEACHING

Courses taught at Texas A&M University:
Modern Physics (PHYS 222)
Electricity and Magnetism (PHYS 298)

RESEARCH SUPERVISION

Ph.D. Students:
Yevgeny Radeonychev received Ph.D. in Physics from the Institute of Applied Physics, Russian Academy of Science, December 1999.
Title of the thesis: "Modification of Relaxation and Coherent Effects in Multi-Level Quantum Systems under the Action of the Strong Field"

Awarded a Medal of the Russian Academy of Science in 2000.
Currently holds the permanent Associate Professor position at Nizhny Norgorod State Univeristy and Senior Scientist position at the Institute of Applied Physics, RAS.

Roman Kolesov received Ph.D. in Physics from the Institute of Applied Physics, 2001.
Title of the thesis: "Laser manipulation of nuclear transitions and a problem of the gamma-ray laser."
Received Ph.D. from Texas A&M University, 2004.
Title of the thesis: "Optical Control of Nuclear Resonant Absorption: Theory and Experiment."
In 2000, received the International Mossbauer Conference Award "For the best student's work and presentation."
Currently permanent Researcher position at the University of Stuttgart.

Elena Kuznetsova received Ph.D. in Physics from Texas A&M University, 2005.
Title of the thesis: "Atomic and Nuclear Interference Phenomena and Their Applications."
In 2004, received the Ashworth-Tsutsui Memorial Research Award of the College of Science, Texas A&M University.
Currently postdoctoral fellow at the University of Connecticut and visiting scientist at ITAMP and Harvard
Petr Anisimov received Ph.D. in Physics from Texas A&M University, 2008.
Title of the thesis: "Quantum Coherence Effects in X-ray Optics."
In 2005 received a first prize in his topical group in the Texas A&M University Student Research Week.
Currently a postdoctoral fellow at Stony Brook University.
In February 2012 received the Director's research fellowship at LANL.

Chris O'Brien received Ph.D. in Physics from Texas A&M University, September 2011.
Title of the thesis: "Coherent control of the optical processes in a resonant medium."
Currently a postdoctoral fellow at the University of Kaiserslautern.

Vladimir Polovinkin, international exchange student, Spring 2010 , 2011,2012
Recievd Ph D from IAP RAS in 2012, currently junior researcher at IAP RAS.
Alexander Bondartsev, international exchange student, Spring 2011.
Currently Ph D student at IAP RAS

Current Students:
Xiwen Zhang, Ph.D. student at Texas A&M University
Timur Akhmedzhanov, student at A&M University
Alexander Waldrop, undergraduate physics students, SNF REU summer 2010 and 2011
M.D. Students:
Vasily Temonov received M.D. in Physics and Mathematics with the Distinction in 1999.
Maria Eruhimova received M.D. in Physics and Mathematics with the Distinction in 1998.
Roman Kolesov M.D. in Physics and Mathematics with the Distinction in 1997.

Former Postdoctorals:
Alexei Belyanin, currently Professor, Department of Physics, TAMU
Yuri Rostovtsev, currently Assistant Professor, University of North Texas, Denton
Victor Kozlov, currently Associate Professor, St. Petersburg University
Roman Kolesov, currently permanent researcher position at the University of Stuttgart
Elena Kuznetsova, currently postdoctoral fellow at the University of Connecticut and visiting scientist at ITAMP and Harvard
Shaoyan Gao, currently Associate Professor, Xian Jiaotong University of China

Alexey Kalachev, currently Associate Professor, Kazan State University, Russia

SYNERGISTIC ACTIVITISE (LAST 10 YEARS)

Scientific expert and member of the panel “Fundamental constitutes of the matter” of the European Research Counsel 2008-2013.

Member of the APS Fellows Committee, 2007-2009.

Referee for National Science Foundation and other founding agencies in USA (Department of Energy, Research Corporation, etc.) and in Europe (ERC, France, Belgium, Great Britain, Austria, Israel, Spain, etc.).

Deputy Editor in Chief of the Journal of the European Optical Society, Journal of Optics, part B: Quantum and Semiclassical Optics, 1993-1998.

Editorial Board Member of the Journal of Optics, part B, 1999.

Guest Co-Editor of the special issue of the International Journal "Laser Physics" on Lasing Without Inversion, 1999.

Co-Editor of the SPIE Proceedings of the Symposium on "Atomic Coherence and Lasing Without Inversion", 1995.

Referee for Phys. Rev. Lett., Phys. Rev. A, Opt. Commun., J. Mod .Optics, Optics Express,Opt. Lett., JOSA, Journal of Optics, part B, Journal of Physics, New Journal of Physics.

Co-Chair (together with Prof. K. Prokhorov) of the Seminar “Fundamental problems of laser physics” within the International Conference “Laser Physics”, 2008-2012.

Co-Chair of the International Conference “Coherent Control of the fundamental processes in optics and x-ray optics”, Nizhny Novgorod-Kazan-Nizhny Novgorod, 2006.

Co-Chair of the 32nd Winter Colloquium on the Physics of Quantum Electronics, Utah, 2002.

Co-Chair of the 5th and 7th AFOSR Workshop "Gamma-Ray Optics and Quantum Nucleonics"-2006, 2004.

Organizer of various sessions within the International Conference “Frontiers of Nonlinear Physics”, 2010, 2007, 2004, 2001, 1998.

Organizer of various sessions within the Physics of Quantum Electronics conference, Snowbird, Utah, 1997-2012.

Member of the Program Committees of the International and National Conferences:
International Workshop on Laser Physics, 2008-2012; International Conference “Frontiers of Nonlinear Physics”, 2001,2004,2007,2010; IQEC/LAT - 2002; EQEC - 2000; Laser Physics and Quantum Optics - 1999; ICONO - 1998; Quantum Optics and Laser Physics - 1997; EQEC'96; ICONO - 1995; Nonlinear Dynamics in Optical Systems -1995; Atomic Coherence and Inversionless Amplification - 1995.

Chair of the Advisory Committee for the Institute for Quantum Studies, 2006-2011.
Member of the Promotion and Tenure Appointment Committee, Physics Department, TAMU,

2001-2006, 2011,2012.

Member of the Search Committee in Atomic and Molecular Physics and Quantum Optics" Physics Department, TAMU, 2006-2012.

Member of the Qualifying Examination Committee Physics Department, TAMU, 1999-2001.

RESEARCH EXPERIENCE

MAIN SCIENTIFIC RESULTS

Electromagnetically Induced Transparancy (EIT)
In the end of 80th - theoretical prediction of the phenomenon of coherent bleaching of the medium (O.Kocharovskaya, Ya.I.Khanin, Sov. Phys. JETP, 1986, v.63, p.945; O.Kocharovskaya and P.Mandel, Phys.Rev. A 42, 1990, p.523). These papers received accordingly over 60 and over 260 citations.
The essence of this phenomenon is in elimination of resonant absorption of electromagnetic field during its propagation through the medium. It is based on quantum interference of two absorption amplitudes when absorption takes place from the coherent superposition of two atomic states. The proper coherent superposition itself is prepared under the action of the propagating field which should consist of the components coupled to the adjacent atomic transitions.
Later this phenomenon became widely known as Electromagnetically Induced Transparency (EIT). It was experimentally discovered by Steve Harris at Stanford University in 1991. For the last two decades EIT has remained the leading research topic in the fields of quantum, coherent and nonlinear optics. It became a common technique for elimination of resonant absorption which has numerous applications such as nonlinear optics at maximum atomic coherence, high precision magnetometry, quantum information processing, etc.

Lasing Without Inversion (LWI)
1988 - prediction of the possibility of light amplification and lasing without population inversion (LWI) in a three-level lambda type medium basedon atomic interference suppressing resonant absorption (O. Kocharovskaya, Ya.I.Khanin, JETP Lett., 1988, v.48, p.630). This paper received over 340 citations. This prediction was fully confirmed experimentally (A.Nottelman et al., PRL, v.70, p.1783, 1993) . The review paper on LWI (O.Kocharovskaya, Phys.Rep., v.219, p.175, 1992) received over 390 citations.
1988-1992 - suggestion and comparative analysis of the basic schemes for amplification and lasing without inversion, in particular, double lambda, V and lambda schemes (O.Kocharovskaya and P.Mandel, Phys.Rev. A 42, 1990, p.523; O.Kocharovskayaet al., Opt. Commun.,v.77, p.215,199O; Kocharovskaya, P. Mandel, Opt.Commun. v.84,p.179,1991; O.Kocharovskaya, P.Mandel, Y.Radeonychev, Phys.Rev.A, v.45, p.1997, 1992. All these schemes were successfully realized experimentally (E.S. Fry et al., PRL , v.70, 3235, 1993; A.S.Zibrov et al., PRL, v.75, 1499, 1995; G.G. Padmabandu et al., PRL, v. 76, 2053, 1996; J.A.Kleinfeld, A.D.Streater Phys.Rev.A, v. 53, 1839, 1996).
1998-2001 - study of the thermodynamic restrictions inherent to LWI (O.Kocharovskaya et al. Phys.Rev.A, v.58, p.649, 1998), CW LWI in the absence of the coherent driving (O.Kocharovskaya et al., Phys.Rev.A, v.65, 013803, 2001; superradiance regimes of LWI (V.Kozlov, O.Kocharovskaya, Y.Rostovtsev, M.O.Scully, Phys.Rev.A, v.59, p.3986, 1999), suggestion of the LWI schemes with the self-generated driving for generation of X-rays in laser plasma and infrared radiation in semiconductor quantum wells (A.Belyanin, G.Bently, F.Capasso, O.Kocharovskaya, M.O.Scully, Phys.Rev.A, v.64, 013814, 2001).

These works were followed by theoretical and experimental research in many laboratories worldwide. Currently the focus of this research is on realization of the far-infrared generation in semiconductors and X-ray lasing where population inversion is difficult to obtain because of fast decay of the excited state

Coherent Control of the Gamma Ray Nuclear Transitions

1999 - prediction of the possibility of laser manipulation of gamma-ray nuclear transitions based on the resonant laser driving of the electronic transitions and hyperfine coupling between electronic and nuclear degrees of freedom (O.Kocharovskaya, R.Kolesov, and Y.Rostovtsev, PRL, v.82, p.3593,1999 which received over 20 citations).

1999-2000 - resolution of the gamma-ray laser dilemma via suggestion of LWI scheme of gamma-ray laser involving coherent optical driving of the electronic transition and proving a compatibility of the requirements for sufficientlyhigh incoherent pump and sufficiently low heating of the medium (do not disturbing the Mossbauer effect conditions) in this scheme (O.Kocharovskaya et al., Laser Phys., v.9, p.745, 1999; R.Kolesov, Yu.Rostovtsev, O.Kocharovskaya, Opt. Commun., v.179, p.537, 2000).

2002 - first experimental demonstration of EIT at the nuclear transitions in gamma-rays by collaboration of the Catholic Leuven University and TAMU groups (R.Coussement, ..., O.Kocharovskaya, PRL, v.89, p.107601, 2002).

2004 - first experimental demonstration of the Mossbauer spectrum modification under the laser action by TAMU group (F.Vagizov, R.Kolesov, O.Kocharovskaya, J. Mod. Opt., v.51, p.2579, 2004) and suggestion of the gamma-rays compression technique similar to the chirped pulse amplification in optics (E.Kuznetsova, R.Kolesov, and O.Kocharovskaya, Phys.Rev.A, v.68, p.043801, 2004).

2006 F.Vagizov, R.Kolesov, S.Olariu, Y.Rostovtsev, O.Kocharovskaya, Experimental observation of vibration produced by pulsed laser beam in MgO:57Fe, Hyperfine Interactions, p.917,v.167, 2

2007 P.Anisimov, Y.Rostovtsev, O.Kocharovskaya, Concept of spinning magnetic field at magic-angle condition for line narrowing in Mossbauer spectroscopy, Phys.Rev.B76,094422, 2007.

2007 Experimental demonstration and study of ERIT via the level crossing absorption. P.Anisimov, F.Vagizov,Y.Rostovtsev,R.Shakhmuratov,O.Kocharovskaya, Suppression of gamma-ray absorption via quantum interference , J. Mod. Optics, p. 2595, vol. 54, (2007)

2009 Shakhmuratov R.N., Vagizov F., Odeurs J., Kocharovskaya O., "Slow gamma-photon with a doublet structure: time delay via a transition from destructive to constractive interference of collectively scattered radiation with incoming photon", Physical Review A, p. 063805, vol. 80,(2009).

2011 . R. N. Shakhmuratov, F.Vagizov, O. Kocharovskaya, Radiation burst from a single γ -photon field, Phys. Rev. A 84, 043820 (2011).

Stopping of a Light Pulse

2001 - prediction of the possibility to freeze the light pulse due to its Fizeau dragging by hot atoms in a stationary gaseous cell under EIT conditions (O.Kocharovskaya, et al., PRL, v.86, p.628, 2001). This paper received over 160 citations. This prediction received an experimental proof at JET Propulsion Lab (D.Strekalov et al., JMO, 2004).

2009 – first experimental demonstration of slowing down single gamma-ray photon to the speed of ~500ms (R. Shakhmuratov et al., Phys.Rev.A, 2009)

Generalized Master Equation and Field-Dependent Relaxation Effects

1994-1999 - generalization of the master equation for a multi-level atomic system for the case of a strong coupling with multi-frequency field (O.Kocharovskaya et al., Phys.Rev.A, v.49, p.4928, 1994) and prediction of the new effects caused by modification of the relaxation processes such as spontaneous radiation from the ground atomic level, population trapping at one of dynamical Stark level, high-refraction index in a combination with the vanishing absorption, the possibility of population inversion at the driven transition, etc. (O.Kocharovskaya et al., PRL, v.74, p.2451, 1995; O.Kocharovskaya and Y.V.Radeonychev, Quantum Semiclass. Opt., v.8, p.7, 1996; O.Kocharovskaya and Y.V.Radyonychev, Found. of Phys., v.28, p.561, 1998; O.Kocharovskya et al., Phys.Rev. A, v.60, p.3091, 1999).

Atomic Interference Phenomena in Solids

Extension of the theory of EIT, Slow Light and LWI to the solid materials (taking into account inhomogeneous broadening both at the resonant and two-photon transitions, the phonon line broadening, spin-spin and spin-lattice relaxation, etc.), E. Kuznetsova, O. Kocharovskaya, P. Hemmer, M.O. Scully, Phys.Rev. A, v.64, p.013814, 2002;

Suggestion of the atto-second pulses generation via multiple Raman scattering based on the long-lived spin coherence (R.Kolesov and O.Kocharovskaya, Phys.Rev. A, v.67, 023810, 2003);

Coherent control of excited state absorption and its application for UV and VUV generation in rare-earth doped crystals(E.Kuznetsova, R.Kolesov, and O.Kocharovskaya, Phys.Rev. A, v.70, p.043801, 2004);
R.Kolesov, E. Kuznetsova,O.Kocharovskaya,Phys.Rev.A 71, 043815, 2005;
Proposal for coherent population trapping via a continuum with train of ultrashort pulses,(E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Phys.Rev.A 74, 033804, 2006);

Experimental demonstration of manipulation of Zeeman coherence in solids at room temperature: Ramsey interference in CPT in ruby (R.Kolesov, M.O.Scully, O.Kocharovskaya, , Phys.Rev. A 74,053820, 2006)

Proposal for generation of coherent teraherz pulses in ruby at room temperature (E.Kuznetsova,Y.Rostovtsev, N.Kalugin, R.Kolesov, O.Kocharovskaya,M.O.Scully, ,Phys.Rev. A74, 023819, 2006).

Proposal for laser control and enhancement of refractive index in solids with excited-state absorption
C. O'Brien, O. Kocharovskaya, "Resonant enhancement of Refractive index in transition doped crystals via coherent control of excited state absorption", Journal of Modern Optics, p. 1933, vol. 56, (2009).

First experimental demonstration of EIT at the dimmers of ions in solids and its application for studies of the mechanisms of the ions interaction.
R. Akhmedzhanov, A. Bondartsev, V. Chernov, L. Gushchin, O. Kocharovskaya, "Double optical resonance spectroscopy of the Nd3+ ionpairs in LaF3 crystal", J. Lumin.,p.1610, vol.130 (2010).

Coherent Dynamical Control of the Resonant light-matter interaction in the Medium with Variation of the Parameters of the Resonant Transition
Prediction of the modulation induced transparency:
Y.V. Radeonychev,M.D.Tokman,A.G.Litvak,O.Kocharovskaya,Acoustically induced transparency in optically dense resonance medium, Phys.Rev.Lett., 96, 093602,2006.

Suggestion of the new efficient methods of atto-second pulses formation:
Y.V. Radeonychev, V.A. Polovinkin, and O. Kocharovskaya, “Extremely Short Pulses via Stark Modulation of the Atomic Transition Frequencies”, Phys. Rev.Lett., 105, 183902, 2010.
V.A. Polovinkin, Y.V. Radeonychev, and Olga Kocharovskaya, Opt. Lett., Opt. Lett.,36,2296, 2011.

Proposal of the controllable optical photonic structures: C.O’Brien and O.Kocharovskaya, Optically controllable photonic structures with zero absorption, Phys. Rev. Lett., PRL 107, 137401 (2011).

OLGA KOCHAROVSKAYA

LIST OF SCIENTIFIC PUBLICATIONS

Publications in the Referred Journals

(The names of Olga Kocharovskaya's current or former graduate students are outlined)

1. O.Kocharovskaya, V.B.Tsaregradsky, Mechanisms of spectral line broadening of quantum oscillators with a beam of inflying atoms, Izv.Vuz. Radiophyz., v.22, n12, pp.1427-1436.
2. O.Kocharovskaya, Ya.I.Khanin, V.B. Tsaregradsky, Resonance effects under the interaction of two-level system with intensive polichromatic radiation, Zh.Eksp.Theor.Fiz., v.86, n. 2, pp. 423-433; Sov.Phys.JETP, 1984.
3. O.Kocharovskaya, V.B.Tsaregradsky,Peculiarities of the stationary generation of maser in case of the polarizing pumping, Izv. Vuz. Radiofyz., v.27, n. 4, pp.863-865, 1984.
4. O.Kocharovskaya, Ya.I.Khanin, V.B.Tsaregradsky, Laser mode-locking due to interaction in the resonant medium with the splitted level, Kvant. Electron. (Sov. J. Quant. Electron.), v.12, n. 6, pp.1227-1234, 1985;
5. O.Kocharovskaya, Ya.I.Khanin, Population trapping and coherent bleaching of three-level medium by the ultrashort pulse train, Zh.Eksp.Theor.Fiz., v.90, pp.1610-1618, 1986; Sov. Phys. JETP, v.63, pp.945-952, 1986.
6. O.Kocharovskaya, Ya.I.Khanin, V.B.Tsaregradsky, About possibility of the ultrashort pulses generation and modelocking by the Raman-filter, Kvant. Electron(Sov. J. Quant. Electron.), v.13, n. 1, pp.193-195, 1986;
7. O.Kocharovskaya, Passive mode-locking by the Raman-filter, Izv. Vuz. Radiofyz., v.29, n. 7, pp.863-865, 1986.
8. O.Kocharovskaya, Ya.I.Khanin, Coherent amplification of the ultrashort pulse in the three-level medium without population inversion, Pisma JETP Zh.Eksp. Theor. Fiz., v.48, pp.581-584, 1988; JETP Lett., v.48, p.630, 1988.
9. O.Kocharovskaya, Coherent low-frequency effects in a three- level medium with the asymmetric transitions,Kvant. Elektron., v.17,n.1, pp.20-27, 1990; Sov. J. Quant. Electron., v.20, n. 1, pp.14-20, 1990.
10. O.Kocharovskaya and P.Mandel, Amplification without inversion: the double lambda scheme, Phys.Rev. A 42, n.1, pp.523-535, 1990.
11. O.Kocharovskaya, P.Mandel and R.-D.Li, Lasing without inversion: the double lambda scheme, Opt. Commun., v.77, n. 2,3, pp.215-220, 1990 .
12. Ya.I.Khanin and O.Kocharovskaya, Inversionless amplification of ultrashort pulses and coherent population trapping in athree-level medium , J. Opt. Soc. Am., v.B-7, n.10, pp. 2016-2024, 1990.
13. O.Kocharovskaya, P.Mandel and Ya.I.Khanin, Lasers without population inversion, Izv.Acad.Nauk SSSR, ser. fiz., v.54, n. 10, pp.1979-1987, 1990.
14. O.Kocharovskaya and P.Mandel, Frequency up-conversion in athree-level medium without inversion, Opt. Commun., v.84, n. 3,4, pp.179-183, 1990 .
15. O.Kocharovskaya, F.Mauri and E.Arimondo, Laser without population inversion and coherent trapping, Opt. Commun., v.84, n. 5,6, pp.393-400, 1991.
16. O. Kocharovskaya, F.Mauri, B.Zambon and E.Arimondo, Coherentpopulation trapping in lasers without inversion, in "Laser Spectroscopy", eds. M.Ducloy, E.Giacobino and G.Camu, World Scientific, p.307-309, 1991.
17. O.Kocharovskaya, P.Mandel and Y.Radeonychev, Inversionless amplification in a three-level medium, Phys.Rev. A 45, pp. 1997-2005, 1992.
18. O.Kocharovskaya, Amplification and lasing without inversion, Phys.Rep., v.219, pp. 175-191, 1992.
19. P.Mandel and O.Kocharovskaya, Inversionless amplification of a monochromatic field by a three-level medium, Phys. Rev. A 46, pp.2700-2706, 1992.
20. Mandel and O.Kocharovskaya, Inversionless Amplification in a multilevel system, Phys.Rev.A 47, pp.5003-5008, 1993.

21. C.H.Keitel, O.Kocharovskaya, L.M.Narducci, M.O.Scully , S.-Y.Zhu and H.M.Doss, Two Mechanisms of Inversionless amplification in four-level atoms with Raman pumping, Phys.Rev.A 48, pp.3196-3201, 1993.
22. Kocharovskaya, S.-Y.Zhu, M.O.Scully, P.Mandel and Y.V.Radeonychev, "Generalization of the Maxwell-Bloch equations to the case of strong atom-field coupling",Phys. Rev. A.49, 4928, 1994.
23. O.Kocharovskaya and P.Mandel, "Basic models of lasing without inversion:general form of amplification condition and problem of self-consistency", Quantum Optics, 6, 217, 1994.
24. O.Kocharovskaya, P.Mandel and Ya.I.Khanin, Problem of inversionless amplification, BRAS, Phys./Suppl.:Phys.vib., v.58, n.1, p.10-15, 1994;
25. Y.V.Radeonychev and O.A.Kocharovskaya, Influence of a strong field on the relaxation of a three level atom.BRAS, Phys./Suppl.: Phys. vib., v.58, n.1, p.16-20, 1994.
26. O.A.Kocharovskaya and Y.V.Radeonychev,, Self-consistency of inversionless laser basis schemes.BRAS, Phys./Suppl.: Phys.vib., v.58, n.2, p.79-85, 1994;
27. O.Kocharovskaya, P.Mandel, M.O.Scully, Atomic coherence via modified spontaneous relaxation, Phys. Rev. Lett., 74, 2451, 1995.
28. O.Kocharovskaya, From lasers without inversion to gamma-ray lasers, Laser Physics, v.5, p.284, 1995.
29. O.Kocharovskaya and Y.V.Radeonychev,, Symmetry breaking of the two-level atomic response due to field-dependent relaxation, Quant.andSemiclas. Opt., 8, p.7-13, 1996;
30. O.Kocharovskaya and Ya.I.Khanin, Lasers without population inversion, in : Russian Science: Withstand and Revive, p.133-139. International Science Foundation.
31. Kocharovskaya O.Lasers Without Inversion:Problems and Prospects, Hyperfine Interactions, v.107,p.187-195, 1997.
32. O.Kocharovskaya, P.Mandel, Atomic coherence and field-dependent relaxation in strongly driven three-level atoms, J.Tech.Phys., v.38, n. 2,pp.235-237, 1997.
33. M.Louffler, D.Nikonov, O.Kocharovskaya and M.O.Scully, High-field index enhancment via selective population of dressed states, Phys. Rev A 56, p.5014, 1997.
34. O.Kocharovskaya and Y.V.Radeonychev,, Spontaneous emission from the ground atomic state due to its crossing with a dynamical Stark level, Found. of Phys., v. 28, p.561, 1998.
35. O.Kocharovskaya, Yu.Rostovtsev, A.Imamoglu,Inversionless Amplification in the three-level atoms with and without "hidden" inversion in reservoir,Phys.Rev. A.58, p.649, 1998.
36. O.Kocharovskaya, R.Kolesov, Y.Rostovtsev, Coherent Optical Control of Mossbauer Spectra, Phys.Rev.Lett. 82 ,3593, 1999.
37. O.Kocharovskaya, Y.V.Radeonychev,P.Mandel,M.O.Scully, Field dependent relaxation effects in a three-level system driven by a strong coherent field, Phys.Rev. A 60, p.3091, 1999.
38. V.Kozlov, O.Kocharovskaya, M.O.Scully, Effective two-level Maxwell-Bloch formalism and coherent pulse propagation in a driven three-level medium, Phys.Rev.A.59, p. 3986, 1999.
39. V.Kozlov, O.Kocharovskaya, Y.Rostovtsev, M.O.Scully, Superfluorescence without inversion in coherently driven three-level systems, Phys.Rev.A 60, 1598, 1999.
40. O.Kocharovskaya, M.O.Scully, P.Mandel, Preface of the Guest Editors, Laser Physics, v.9, p.745, 1999.
41. O.Kocharovskaya, R.Kolesov, Y.Rostovtsev, Lasing without inversion: a new path to gamma-ray laser, Laser Physics, v.9,p.745, 1999.
42. Y.V.Radeonychev,, I.Koryukin, O.Kocharovskaya, R.Corbalan, R.Vilaseca, Dynamical manifestation of two mechanisms of lasing without inversion, J.Opt.B: Quant. and Semiclass. Opt., 1, p.580-587, 1999.
43. R.Kolesov, Y.Rostovtsev, O.Kocharovskaya, Laser Control of Mossbauer Spectra as a way to gamma-ray lasing,Opt. Commun., v.179, pp.537-547, 2000.
44. O.Kocharovskaya, Y.Rostovtsev, M.O.Scully, Freezing light via atomic coherence, Phys.Rev.Lett 86, 628, 2001.

45. M.O. Scully, G.S. Agarwal, O. Kocharovskaya, V.V. Kozlov, A.B. Matsko,"Mixed electromagnetically and self-induced transparency", Opt. Express, 8, 66, 2001.
46. A. Matsko, O. Kocharovskaya, Y. Rostovtsev, G.R. Welch, A.S. Zibrov, M.O. Scully, Slow, Ultra-slow, stored and frozen light, The Advances in Atomic, Molecular, and Optical Physics 46, 191, 2001, edited by B. Bederson and H.Walther.
47. O.Kocharovskaya, A.Matsko, Y.Rostovtsev, Lasing without inversion via decay induced coherence, Phys.Rev.A 65, 013803, 2001.
48. A. Belyanin, C.Bently, F.Capasso, O.Kocharovskaya, M.O.Scully, Inversionless lasing with self-generated driving field, Phys.Rev.A 64, 013814, 2001.
49. A.B. Matsko, Yu. Rostovtsev, O. Kocharovskaya, A. Zibrov, M.O. Scully, Nonadiabatic Approach to Quantum Optical Information Storage, Phys. Rev. A 64, 043809, 2001.
50. Y. Rostovtsev, and O. Kocharovskaya, Modification of Mossbauer spectra under the action of electromagnetic fields, Hyperfine Interactions, 135, 233-255, 2001.
51. E.Kuznetsova, O.Kocharovskaya, P.Hemmer and M.O.Scully, Atomic interference phenomena in solids with a long-lived spin coherence, Phys.Rev.A 66,063802, 2002.
52. A. S. Zibrov, A. B. Matsko, O. Kocharovskaya, Y. V. Rostovtsev, G. R. Welch, and M. O. Scully, Transporting and Time Reversing Light via Atomic Coherence, Phys. Rev. Lett. 88, 103601, 2002.
53. Y. Rostovtsev, O. Kocharovskaya, G. Welch, M.O. Scully, Slow, ultra-slow and freezing light, Optics and Photonics News, October 2002.
54. Y.Rostovtsev, M.Scully, O.Kochrovskaya, Stop and Go control of light in hot atomic gases, J. Mod. Phys., 4,2637-2643, 2002.
55. A. Javan, O. Kocharovskaya, H. Lee, M. O. Scully, Narrowing of electromagnetically induced transparency resonance in a Doppler broadened medium, Phys. Rev. A 66, 013805, 2002.
56. E.Kuznetsova, O. Kocharovskaya, P. Hemmer, M.O. Scully,Atomic interference phenomena in solids with a long-lived spin coherence, Phys. Rev. A 66, 063802, 2002.
57. R. Coussement, Y. Rostovtsev, J. Odeurs, G.Neyens, H. Muramutsu,S. Gheysen, R. Callens, K.Vyvey, G.Kozyreff, P. Mandel, R.Shakhmuratov, and O. Kocharovskaya, Controlling absorption of gamma radiation via nuclear level anticrossing, Phys. Rev. Lett. 89, 107601, 2002.
58. Y.V.Radeonychev,, M.D. Tokman , A.G. Litvak, O. Kocharovskaya, Acoustically induced transparency and generation of multifrequencyradiation, Laser Physics, v.13, p.1308, 2003.
59. R.Kolesov and O. Kocharovskaya, Ultrashort pulses generation in solid media with long-lived spin coherence, Phys. Rev.A 67, 023810, 2003.
60. E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Compression of gamma-ray photons into ultrashort pulses, Phys.Rev. A 68, 043825, 2003.
61. Y.Rostovtsev, R.Kolesov, O.Kocharovskaya, Laser-Mossbauer spectroscopy as a new tool for studies of nuclear transitions, Hyperfine Interactions, v.143, p.121, 2002.
62. J.Odeurs, R.Coussement, K.Vyvey, H. Muramatsu,S. Cheysen, R. Callens,G. Neyens,I. Serdons, R. Schakhmuratov, Yu. Rostovtsev,O. Kocharovskaya, Induced transparency forgamma radiation via nuclear level mixing, Hyperfine Interactions, v.143, p.121, 2002.
63. R.Coussement, S.Gheysen, I.Serdons,R.Callens,K.Vyvey,R.Schakhmuratov, J.Odeiurs, P.Mandel, Y.Rostovstev, O.Kocharovskaya, Slowing down of gamma photons, Hyperfine Interactions, v.151, p.93, 2003.
64. Y.V.Radeonychev, M.Erukhimpova, R.Vilaseca, O.Kocharovskaya, Dynamic Control of a three-level atom response in a photonic crystal, Laser Physics, v.14, p.702, 2004.
65. Y. Golubev, O.Kocharovskaya, Y.Rostovtsev, M.O.Scully, Sub-Poissonian three-level lasing with an m-photons coherent pump, Journal of Optics B- Quanmum and Semiclassical Optics, v.6, p.309, 2004.
66. E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Suppression of excited-state absorption: a parth to ultraviolet tunable solid-state lasers, Physical Review A 70, 043801, 2004.

67. F.Vagizov, R.Kolesov,O.Kocharovskaya, Experimental Observation of laser-induced modifiation of Mossbauer Spectra, ,J. Mod. Optics, v.51, 2579, 2004.
68. P.Anisimov,Y.Rostovtsev, O.Kocharovskaya, Mossbauer Spectra Narrowing by Spinning Magnetic Field, J. Mod. Optics, v.51, p. 2615, 2004.
69. V.A.Sautenkov, C.Y.Ye, Yu.Rostovtsev, M.O.Scully, O.A.Kocharovskaya, Electromagnetically induced transparency with a train of short pulses in Rb vapor, Izv. Vuz. Radiofyz.,v.XLVII, n10-11, 2004.
70. Y.V.Radeonychev,, M.Erukhimpova, O.Kocharovskaya, R.Vilaseca, Electromagnetically induced transparency and lasing without inversion in three level atom imbedded in a frequency dependent environment, Izv.Vuz., Radifyz., v.XLVII, n10-11, 2004.
71. S.Olariu, R.Kolesov, F.Vagizov, O.Kocharovskaya, Effects of Optical Radiation on the Mossbauer Spectrum of 151Eu:CaF2, J . Mod. Optics, p.877, v.52, 2005.
72. V.A.Sautenkov, C.Y.Ye, Y.Rostovtsev,G.R.Welch,O.Kocharovskaya,M.O.Scully, Electromagnetically induced transparency in rubidium vapor prepared by a comb of short optical pulses, Physical Review A 71, .063804, 2005.
73. N.Shakhmuratov, J.Odeurs, S.Gheysen, Y.Rostovtsev, O.Kocharovskaya, P.Mandel, Level mixing induced transparency for gamma radiation, Appl.Phys. B, v.81, p.883-888, 2005.
74. P.Anisimov, Y.Rostovtsev, O.Kocharovskaya, Mossbauer Spectra narrowing by the “magic-angle” technique, J.of Mod.Optics, v.52, p.2401, 2005.
75. R.Kolesov, E. Kuznetsova,O.Kocharovskaya, Continuum-coupled solitary waves in a Resonant amplifier with excited-state absorption, Phys.Rev.A 71, 043815, 2005.
76. Y.V.Radeonychev,,M.D.Tokman,A.G.Litvak,O.Kocharovskaya,Acoustically induced transparency in optically dense resonance medium, Phys.Rev.Lett., 96, 093602,2006.
77. E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Coherent population trapping via a continuum with train of ultrashort pulses, Phys.Rev.A 74, 033804, 2006.
78. R.Kolesov, M.O.Scully, O.Kocharovskaya, Manipulation of Zeeman coherence in solids at room temperature: Ramsey interference in CPT in ruby, Phys.Rev. A 74, 053820, 2006.
79. E.Kuznetsova,Y.Rostovtsev, N.Kalugin, R.Kolesov, O.Kocharovskaya,M.O.Scully, Generation of coherent teraherz pulses in ruby at room temperature,Phys.Rev. A74, 023819, 2006.
80. R.N.Shakhmuratov, J.Odeurs, S.Ghesen, Y.Rostovtsev,O.Kocharovskaya,P.Mandel, Level mixing induced transparency II. Different transition probabilities f the crossing lines, Appl. Phys. B,83, 635, 2006.
81. E.K.Sadykov, A.AYurichuk,F.V.Vagizov,O.Kocharovskaya, Controlled quantum interference, JETP Lett., 84, 203, 2006.
82. F.Vagizov, R.Kolesov, S.Olariu, Y.Rostovtsev, O.Kocharovskaya, Experimental observation of vibration produced by pulsed laser beam in MgO:57Fe, Hyperfine Interactions, p.917,v.167, 2006.
83. E.K.Sadykov, V.V.Arinin, G.I.Petrov,A.V.Pyataev, F.G.Vagizov, O.Kocharovskaya, Radio-frequency coherence and controllable quantum interference in Mossbauer spectroscopy, Hyperfine Interactions,p.893, v.167, 2006.
84. E.K.Sadykov, V.V.Arinin,F.G.Vagizov, O.Kocharovskaya, Radiofrequency stimulated interference on Mossbauer transitions, Laser Physics, p.727,v.17, 2007.
85. E.K.Sadykov,V.V.Arinin, G.G.Vagizov, O.Kocharovskaya, Controllable quantum interference in Mossbauer spectroscopy: valve effect, Izvestiya of Russian Academy of Science, ser. Phys., p.1232,v.71, 2007.
86. P.Anisimov, Y.Rostovtsev, O.Kocharovskaya, Concept of spinning magnetic field at magic-angle condition for line narrowing in Mossbauer spectroscopy, Phys.Rev.B76,094422, 2007.
87. F.Vagizov, S.Olariu,O.Kocharovskaya, Experimental search for laser-induced effects in 151Eu and 57Fe doped crystals, Laser Phys., p.734, v.17, 2007.

88. P.Anisimov, Y.Rostovtsev,O.Kocharovskaya, Suppression of inhomogeneous line broadening of Mossbauer resonance by spinning magnetic field, Laser Phys.,p. 1193, vol. 17, (2007).
89. E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Coherent population trapping with a train of pulses and its applications, Laser Physics, 17, 1187, 2007.
90. P.Anisimov, F.Vagizov,Y.Rostovtsev,R.Shakhmuratov,O.Kocharovskaya, Suppression of gamma absorption via quantum interference , J. Mod. Optics, p. 2595, vol. 54, (2007)
91. P.Anisimov, Y.Rostovtsev, O.Kocharovskaya, in Mossbauer spectroscopy", Physical Review B, p.094422, vol. 76, (2007).
92. Sadykov, V.V.Arinin,F.Vagizov,O.Kocharovskaya, Transparency of the thin absorber in MOssabuer optics: role of electronic relaxation, JETP Lett. v.88, p.436, 2008.
93. P.Anisimov, O.Kocharovskaya, "Decaying dressed states analysis of the coherently driven three-level system", Journal of Modern Optics, p.3159, vol. 55, (2008).
94. F.G. Vagizov, R.A.Manapov, E.K.Sadykov, V.V.Lyubimov, O.A.Kocharovskaya, "The effect of a radio-frequency magnetic field on resonant absorption saturation in FeBO3", Hyperfine Interactions, p. 143, vol. 188, (2009).
95. Y.V. Radeonychev, I.V.Koryukin, O.Kocharovskaya, "Continues wave photonic crystal laser in ultraviolet range", Laser Physics, p. 1207, vol.19, (2009).
96. Y.V.Radeonychev, V.A.Polovinkin, O.Kocharovskaya, "Pulse shaping via modulation of resonant absorption", Laser Physics, p. 769, vol. 19, (2009).
97. C. O'Brien, O. Kocharovskaya, "Resonant enhancement of Refractive index in transition doped crystals via coherent control of excited state absorption", Journal of Modern Optics, p. 1933, vol. 56, (2009).
98. Shakhmuratov R.N., Vagizov F., Odeurs J., Kocharovskaya O., "Slow gamma-photon with a doublet structure: time delay via a transition from destructive to constractive interference of collectively scattered radiation with incoming photon", Phys. Rev. A, p. 063805, vol. 80, (2009).
99. S.Gao, O.Kocharovskaya, "Coherent control of one-photon and two-photon fluorescence channels in three-level ladder system", Journal of Modern Optics, p. 1941, vol. 56, (2009).
100. E.K. Sadykov, F.G. Vagizov, V.V. Arinin, O.A. Kocharovskaya, Transparency of a thin absorber inMoessbauer optics: effect of electron relaxation, Journal of Physics, 217, 012016 (2010).
101. F.G. Vagizov, E.K. Sadykov, O.A. Kocharovskaya, Determination of the Lamb-Mössbauer factor by the delayed coincidence technique, ISSN 1062-8738, Bulletin of the Russian Academy of Sciences: Physics, 2010, Vol. 74, No. 3, pp. 310–314, Allerton Press, Inc., 2010.
102. E.K. Sadykov, F.G. Vagizov, V.V. Arinin, B.M. Khasanov, O.A. Kocharovskaya, The mechanism of Mössbauer absorber transparency under nuclear level anticrossing conditions,ISSN 1062-8738, Bulletin of the Russian Academy of Sciences: Physics, 2010, Vol. 74, No. 3, pp. 305–309, Allerton Press, Inc., 2010.
103. R. N. Shakhmuratov, F. G. Vagizov, J. Odeurs, and O. Kocharovskaya, Coherent Forward Scattering of a Single Photon Wave Packet in a Resonant Medium, ISSN 1062_8738, Bulletin of the Russian Academy of Sciences: Physics, 2010, Vol. 74, No. 7, pp. 954–958,Allerton Press, Inc., 2010.
104. R. Akhmedzhanov, A. Bondartsev, V. Chernov, L. Gushchin, O. Kocharovskaya, "Double optical resonance spectroscopy of the Nd3+ ion pairs in LaF3 crystal", J. Lumin., p.1610, vol.130 (2010).
105. Y.V. Radeonychev, V.A. Polovinkin,O. Kocharovskaya, “Extremely Short Pulses via Stark Modulation of the Atomic Transition Frequencies”, Phys. Rev. Lett., 105, 183902, 2010.
106. V.A. Polovinkin, Y.V. Radeonychev, and O. Kocharovskaya, Few-cycle attosecond pulses via periodic resonance interaction with hydrogen-like atoms, Optics Letters Vol. 36, No. 12 p.2296-2298 (2011).

107. A. Kalachev and O. Kocharovskaya, Quantum storage via refractive index control, Phys. Rev. A 83, 053849 (2011).
108. C.O'Brien and O.Kocharovskaya, Optically controllable photonic structures with zero absorption, Phys. Rev. Lett., 107, 137401 (2011)
109. R. N. Shakhmuratov, F.Vagizov, O. Kocharovskaya, Radiation burst from a single γ -photon field, Phys. Rev. A 84, 043820 (2011).
110. C.O'Brien, P. Anisimov, Y. Rostovtsev, O.Kocharovskaya, Coherent Control of the Refractive Index in a Far-detuned Λ System, Phys. Rev. A 84, 063835 (2011).
111. Y.V. Radeonychev, V.A. Polovinkin, and O. Kocharovskaya, Extremely short pulses via resonantly induced transparency, Laser Physics v.21, No 7 pp.1243-1251 (2011).
112. A.Kalachev and O.Kocharovskaya, Refractive index control for quantum storage, Journal of Modern Optics, 58, 1971-1976 (2011).
113. O.O'Brien, S.Gao, O.Kocharovskaya, Coherent Control of Optical Fluorescence Channels in 3-Level Systems, Journal of Modern Optics, 58, 2036-2042 (2011).
114. R. N. Shakhmuratov, F. G. Vagizov, O. Kocharovskaya, Principles of control of the single photon states in optically thick resonant medium, ISSN 1062?8738, Bulletin of the Russian Academy of Sciences. Physics, 2012, Vol. 76, No. 3, pp. 248–251. © Allerton Press, Inc., 2012
115. A. Kalachev and O.Kocharovskaya, Superradiance in the medium with close to zero refractive index, ISSN 1062?8738, Bulletin of the Russian Academy of Sciences. Physics, 2012, Vol. 76, No. 3, pp. 252–255. © Allerton Press, Inc.,2012.
116. Y.V. Radeonychev, V.A. Polovinkin, and O. Kocharovskaya, Resonant generation of few-cycle XUV pulses in hydrogenlike atoms, Laser Physics, Vol. 22, No. 10, pp. 1547–1552 (2012).
117. F. Vagizov, E. K Sadykov, O. Kocharovskaya,Modulation of Mössbauer Radiation by Pulsed Laser Excitation,ISSN 0021-3640, JETP Letters, 2012, Vol. 96, No. 12, pp. 812–816. © Pleiades Publishing, Inc., 2012.
118. X. Zhang, A. Kalachev, O. Kocharovskaya, Quantum storage based on control-field angular scanning, Phys. Rev. **A87**, 013811 (2013)
119. R. Shakhmuratov, F., O. Kocharovskaya, Single gamma-photon revival and radiation burst in a sandwich absorber, Phys. Rev. **A87**, 013807 (2013)
120. V. A. Polovinkin, Y. V. Radeonychev, O. Kocharovskaya, Formation of a single attosecond pulse from resonant radiation via interaction with a strongly perturbed atomic transition, *Phys. Rev. Lett.* **110**, 213903 (2013).

Publications in the Conference Proceedings

1. O.Kocharovskaya and Ya.I.Khanin, Light amplification by a three-level atomic system without population inversion, in "Nonlinear Waves III", Proc. Gorky school on Nonlinear Physics, 1989,eds.A. V. Gaponov - Grehov, M. I. Rabinovich and J.Englebrecht (Springer, Heidelberg, 1990), pp.162-168.
2. O.Kocharovskaya, Rabi-frequencies of two-level atom in the strong polichromatic field, Proceedings of the Annual Conference of the Radiophysics Department, Gorky State University, 1984, part 2, p.16-21, VINITI Febr.20, 1985, n 1333-85.
3. O.Kocharovskaya, Ya.I.Khanin, V.B.Tsaregradski, Coherent mode-locking in a three-level medium, Proceedings of the Annual Conference of the Radiophysics Department, Gorky State University, 1984, part 2, p.10-15, VINITI Febr.20, 1985, n1333-85.
4. O.Kocharovskaya, Mechanisms of active mode-locking in a resonant medium with a splitted level, , Proceedings of the Annual Conference of the Radiophysics Department, Gorky State University, 1985, part 1, p.92-96, VINITI July 17, 1986, n5243-B86.

5. O.Kocharovskaya and I.Korykin, Optical bistability in a bimode laser due to coherent bleaching of a three-level absorber, OSA Proceedings on Nonlinear Dynamics in OpticalSystems, N.B.Abraham, E.Garmire, P.Mandel eds.(OSA,Washington, DC 1991), v.7, pp. 251-256.
6. Ya.I.Khanin, O.Kocharovskaya and P.Mandel, Parametric instability of a propagating bichromatic field in a three-level medium, OSA Proceedings on Nonlinear Dynamics inOptical Systems, N.B.Abraham, E.Garmire, P.Mandel eds. (OSA, Washington,DC 1991), v.7, pp.251-256.
7. P.Mandel and O.Kocharovskaya, Amplification, lasing and inversion , in "Nonlinear Dynamics and Quantum phenomena in optical systems", edsR.Vilaseca and R.Corbalan, Springer Proceedings in Physics, v.55, pp.109-119 (Springer Verlag, Heidelberg, 1991).
8. O.Kocharovskaya, P.Mandel and Ya.I.Khanin, Amplification without population inversion, in "Transverse patterns in nonlinear optics", SPAE Proceedings, ed.N.N.Rosanov, v.1840, p.268-279, 1991.
9. O.Kocharovskaya, P.Mandel and Ya.I.Khanin, Amplification without population inversion, in "Transverse patterns in nonlinear optics", SPAE Proceedings, ed.N.N.Rosanov, v.1840, pp. 268-279, 1992.
10. O.Kocharovskaya and Yu.Rostovtsev, Thermodynamicrestrictions on amplification without inversion, Nonlinear waves. Synchronization and Patterns. Part 2. Ed. by M.I.Rabinovich, M.M. Sushcik and V.D. Shalfeev. Nizhny Novgorod: Nizhny Novgorod University Press, pp. 31-37, 1995;
11. O. Kocharovskaya, Prospects for realization of amplification without inversion in gamma-ray range, Proceedings of the International Symposium on Atomic Coherence and Inversionless Amplification, ed.by J.-Y.Gao and S.-Y, Zhu,p.14-21, 1995.
12. A.Andreev, O.Kocharvskaya, P.Mandel, Introduction, Coherent Phenomena and Amplification Without Inversion, SPIE Proceedings of the International Conference on Coherent and Quantum Optics and Laser Optics, ed. By A.A. Andreev, O.Kocharovskaya and P.Mandel, p.1,1996.
13. O.Kocharovskaya and P.Mandel, Lasing Without Inversion:Progress and Prognosis Coherent Phenomena and Amplification Without Inversion, SPIE Proceedings of the International Conference on Coherent and Quantum Optics and Laser Optics, ed. by A.A. Andreev, O.Kocharovskaya and P. Mandel, P.190-197, 1996.
14. Y.V.Radeonychev, P. Mandel and O. Kocharovskaya, Influence of Field-Dependent Relaxation on Amplification Without Inversion , ibid. p.250-259.
15. M.Louffler, D.Nikonov, O. Kocharovskaya and M.O.Scully, ibid. p.317-325.
16. Yu.Rostovtsev, R.Kolesov, O.Kocharovskaya, Inversionless gain at gamma-ray transition via nuclear coherence created by optical driving, First International Induced Gamma-Emission Workshop, Predeal, Romania, Aug.1997.Proceedings.Eds. C. Collins and L. Rivlin.
17. R.Kolesov, Yu. Rostovtsev, O.Kocharovskaya, Nuclear Coherence and inversionless gain at gamma-ray transition, in:Photon Echo and coherent spectroscopy, Proc. SPAE, v. 3239, ed. V.V. Samartsev, p.421-427, 1997.
18. Y.V.Radeonychev,and O.Kocharovskaya, Atomic trapping into excited state due to dynamically modified spontaneous relaxation, Proc. SPAE, 1998, ed. A.S. Chirkin.
19. Y.V.Radeonychev, and O.Kocharovskaya, Atomic trapping in the excited state due to dynamically modified spontaneous relaxation, Proc.SPIE, v.3736, p.202, 1999.
20. M.Erukhimpova, Y.V.Radeonychev,, O.Kocharovskaya, Amplification without inversion based on field-dependent relaxation in strongly driven three-level atoms, Proc.SPIE, v.3736, p.255, 1999.
21. Yu.Rostovtsev, R.Kolesov, O.Kocharovskaya, Inversionless gain at gamma-ray transition via nuclear coherence created by optical driving, Proc. of the First International Induced Gamma Emission Workshop, IGE Foundation, 1999, p. 222,Eds. I.I.Popescu and C.A.Ur.

22. E.Kuznetsova, R.Kolesov, O.Kocharovskaya, Atomic interference phenomena in solids with a long-livedspin coherence, Proceedings of the International Conference: "Progress inNonlinear Science", Volume II. Frontiers of Nonlinear Physics (ed. A.G. Litvak), pp.395-402, 2002.
23. Y.Radeonychev,M.Tokman,A.G.Litvak,O.Kocharovskaya, Vibrationally Induced Transparency in optically dense resonance medium, Proc. SPIE, 4748, 132, 2002.
24. O. Kocharovskaya, A. Belyanin, I.Marienko, Y. Rostovtsev,Atomic and Nuclear Interference Effects for Quantum Information Processing, The Physics of Communication, Proceedings of the XXII Solvay Conference on Phyiscs, eds. I.Antoniou, V.A.Sadovnichy, H.Walter, World Scientific, p.485, 2002.
25. R.Kolesov, E.Kuznetsova, O.Kocharovskaya, Supression of excited-state absorption in laser crystals, Frontiers of Nonlinear Physics, Proceedings of the 2-d International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-ST.-Peterburg, Russia, 5-12 July, 2004, Nizhny Novgorod, p.588
26. F.G.Vagizov, R.Kolesov, O.Kocharovskaya, Laser Induced transformations of 57Fe:MgO Mossbauer spectra, Frontiers of Nonlinear Physics, Proceedings of the 2-d International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-ST.-Peterburg, Russia, 5-12 July, 2004, Nizhny Novgorod, p.50.
27. Y.V.Radeonychev,, M.Erukhimpova,O.Kocharovskaya,Lasing without inversion in a doped photonic crystal, Frontiers of Nonlinear Physics, Proceedings of the 2-d International Conference: Frontiers of Nonlinear Physics,Nizhny Novgorod-ST.-Peterburg, Russia, 5-12 July, 2004, p.601.
28. F.Vagizov,R.Kolesov, S.Olariu, O.Kocharovskaya,Experimental Observation of laser-induced effects in CaF2:Eu single crystals, Isomers and Quanum Nucleonics , Proceedings of the 7th AFOSR Workshop, Dubna, 2005.
29. E.K. Sadykov, V.V. Arinin, A.A. Yurichuk, F.G. Vagizov, "Resonant scattering of Mössbauer photons under the conditions of controllable quantum interference", Proceedings of the VII AFOSR Workshop on Isomers and Quantum Nucleonics, June 26-July 1, 2005, Dubna, Russia, ed. Karamian S., p. 213, vol. , (2006).
30. F.G. Vagizov, R. Kolesov, S. Olariu, O. Kocharovskaya, "Experimental observation of laser-induced effects in CaF2:Eu3+ single crystal", Proceedings of the VII AFOSR Workshop on Isomers and Quantum Nucleonics, June 26-July 1, 2005, Dubna, Russia, ed. Karamian S., p. 181, vol. , (2006).
31. P.Anisimov, F.Vagizov,Y.Rostovtsev,R.Shakhmuratov,O.Kocharovskaya, "Suppression of the gamma-photon absorption via quantum coherence effects under nuclear level anti-crossing in thin samples", Proceedings of III International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-Saratov-Nizhny Novgorod, p. 252, .(2007).
32. R.N.Shakhmuratov, J.Odeurs, F.Vagizov, O.Kocharovskaya, "Two models of level-mixing induced transparency for gamma-radiation", Proceedings of III International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-Saratov-Nizhny Novgorod, p. 209, (2007)
33. Y.V.Radeonychev, I.V.Koryukin,O.Kocharovskaya, "Ultraviolet continues wave photonic crystal laser", Proceedings of III International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-Saratov-Nizhny Novgorod, p. 193, (2007).
34. V.A.Polovinkin,Y.V. Radeonychev,I.V.Koryukin,O.Kocharovskaya, "Pulse train formation in resonant frequency modulated two-level medium", Proceedings of III International Conference: Frontiers of Nonlinear Physics, Nizhny Novgorod-Saratov-Nizhny Novgorod, p. 249, (2007).
35. V.A. Polovinkin, Y.V. Radeonychev, O.A. Koharovskaya, Generation of few-cycle attosecond pulses via dynamic Stark shift and tunnel ionization in hydrogen-like medium, IV-th International Conference "Frontiers of Nonlinear Physics", July 13–20, 2010, Nizhny Novgorod – St.-Petersburg, Russia,Conference proceedings, p.191.
36. C. O'Brien, V. Polovinkin, F. Vagizov, R. Shakhmuratov, R. Akhmedzhanov, A. Bondartsev, L. Gushchin, Y. Radeonychev and O. Kocharovskaya, Quantum coherence effects in solids: new regimes and applications, IV-th International Conference "Frontiers of Nonlinear

Physics", July 13–20, 2010, Nizhny Novgorod – St.-Petersburg, Russia, Conference proceedings, p.299.
37. R. N. Shakhmuratov, F. G. Vagizov, O. Kocharovskaya, Development of the methods ofthe single photon states control in gamma-ray range, Proceedings of V InternationalWorkshop “Science and Innovations-2010”,18-24 July, 2010, Yoshkar-Ola, Russia, Ed. Popov I.I. et all. pp. 226-231.
38. R. N. Shakhmuratov, F.Vagizov, O. Kocharovskaya, Principles of control of the single photon states in optically thick resonant medium, In : Materials of the 6th international scientific school “Science and Innovations-2011”, ISS «SI-2011», Yoshkar-Ola, Russia,18-24 July 2011, p.212—216, Eds. I.I.Popov, et. al., Yoshkar-Ola, Mariinsky State University,2011: -512p.
39. V.A. Polovinkin, Y.V. Radeonychev, O. Kocharovskaya Nearly bandwidth-limited attosecond pulses via periodic resonance interaction with hydrogen-like atoms // Proceedings of the International OSA Topical Meeting "High Intensity Lasers and High Field Phenomena (HILAS 2011)" (Istanbul, Turkey, February 13–18, 2011), presentation number HWB4, published online: http://www.opticsinfobase.org/search.cfm?meetingid=119&year=2011&meetingsession=HWB
40. V. A. Polovinkin, Y. V. Radeonychev, Olga Kocharovskaya, M. Yu. Ryabikin, Formation of Attosecond XUV Pulses via Resonance with Hydrogen-Like Atoms Irradiated by Intense Laser Field in Multiphoton Processes and Attosecond Physics ed. by Yamanouchi, Kaoru; Katsumi, Midorikawa, Springer Proceedings in Physics vol. 125, pp. 71-78 (2012).