

Vasily N. Astratov

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Education

A.F. Ioffe Physico-Technical Institute, Leningrad, USSR Physics Ph.D. 1986
Dissertation: "Spatio-Temporal Evolution of Electric Field in $\text{Bi}_{12}\text{SiO}_{20}$ and $\text{Bi}_{12}\text{GeO}_{20}$ Crystals"
Supervisor: Academician of Russian Academy of Sciences, Prof. Alexander A. Kaplyanskii

Leningrad State University, USSR Physics Diploma (M.S. in Physics) 1981
Thesis: "Method of Measurements of Distribution of Electric Field in Electrooptic Crystals"
Supervisor: Dr. Alexander V. Ilinskii

Employment history

2007 – present **Associate Professor** Department of Physics and Optical Science UNC-Charlotte
Optical characterization, fabrication and modeling of circuits of microspheres with coupled whispering gallery modes, semiconductor pillar microcavities and opals.

2002 – 2007 **Assistant Professor** Department of Physics and Optical Science UNC-Charlotte
Optical characterization, fabrication and modeling of circuits of microspheres with coupled whispering gallery modes, photonic crystal waveguides and opals.

1997 – 2001 **Postdoctoral Fellow** Department of Physics and Astronomy University of Sheffield UK
Developed surface coupling techniques for studying photonic crystal waveguides, studied semiconductor microcavities and synthetic opals.

1981 – 1997 **Member and Senior Member of Staff** Solid State Optics Department A.F. Ioffe Institute
As a group leader at the Ioffe Institute pioneered studies of synthetic opals as photonic crystals for visible light, studied near-surface quantum wells and photorefractive crystals.

1992 – 1997 **Docent** (part time) North-West State Technical University, St. Peterburg, Russia
Taught courses on optoelectronics and electronic devices.

Honors and Awards

2006 Senior Visiting EPSRC Fellow Award in the UK, University of Sheffield
1996 Award of Royal Society and Russian Academy of Sciences, Program of Exchange Visits
1993 Award in the Annual Competition, A.F. Ioffe Physical-Technical Institute
1985 First Prize in the Annual Competition, A.F. Ioffe Physical-Technical Institute

Service

International

- Organizer and Editor of the Focus Issue of Optics Express devoted Microresonators, December 2007
- Journal "Optics Express", Associate Editor, 2005-present
- OECC/ACOFT' 08 subcommittee *Frontiers in Photonics*, deputy chair
- CLEO/QELS' 06 and 07 subcommittee *Fundamentals of Metamaterials* member and alternate chair
- ICTON' 07 and 08 Special session *Microresonators and Photonic Molecules* program committee member
- Expert Panel on Priority DFG Program *Photonic Crystals* in Germany, 2000-2005
- Frequent Reviewer for *Applied Physics Letters*, *Advanced Materials*, *Physical Review B*, *Langmuir*, et al.

National

- Organizer of the Gordon-type Workshop on Physics of Microresonators, Charlotte, 2007
- National Science Foundation Review Panels: Unsolicited Proposals in Photonics/Optics, 2004 and 2006.

Departmental/University: Optics Ph.D. Program Committee, 2002-present; Search Committee, 2004-05.

Major Research Interests

Novel structures: microcavities and photonic crystals, coupled resonator optical waveguides, opals.

Optical properties: band structures, coupling between high- Q cavities, localization of light, polaritons.

Integrated optoelectronics: microlasers, delay lines, sensors and microspectrometers.

Important and Highly Cited Publications (Total number of ISI citations is more than 1500)

A.M. Kapitonov and V.N. Astratov, “Observation of nanojet-induced modes with small propagation losses in chains of coupled spherical cavities”, *Opt. Lett.*, v.32, 409-411 (2007). **ISI times cited 7**

V.N. Astratov, J.P. Franchak, and S.P. Ashili, “Optical Coupling and Transport Phenomena in Chains of Spherical Dielectric Microresonators with Size Disorder”, *Appl. Phys. Lett.*, v.85, 5508-5510 (2004). **ISI times cited 31**

V.N. Astratov, A.M. Adawi, S. Fricker, M.S. Skolnick, D.M. Whittaker, and P.N. Pusey, “Interplay of Order and Disorder in the Optical Properties of Opal Photonic Crystals”, *Phys. Rev. B*, v.66, art.165215 (2002). **ISI times cited 50**

Y.A. Vlasov, V.N. Astratov, A.V. Baryshev, A.A. Kaplyanskii, O.Z. Karimov, and M.F. Limonov, “Manifestation of Intrinsic Defects in Optical Properties of Self-Organized Opal Photonic Crystal”, *Phys. Rev. E*, v.61, No.5, 5784-5793 (2000). **ISI times cited 141**

R.M. Stevenson, V.N. Astratov, M.S. Skolnick, D.M. Whittaker, M. Emam-Ismael, A.I. Tartakovskii, P.G. Savvidis, J.J. Baumberg, and J.S. Roberts, “Continuous Wave Observation of Massive Polariton Redistribution by Stimulated Scattering in Semiconductor Microcavities”, *Phys. Rev. Lett.*, v.85, No.17, 3680-3683 (2000). **ISI times cited 179**

V.N. Astratov, R.M. Stevenson, I.S. Culshaw, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R.M. De La Rue, “Heavy Photon Dispersions in Photonic Crystal Waveguides”, *Appl. Phys. Lett.*, v.77, No.2, 178-180 (2000), **ISI times cited 47**

V.N. Astratov, I.S. Culshaw, R.M. Stevenson, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R.M. DeLaRue, Resonant Coupling of Near-Infrared Radiation to Photonic Band Structure Waveguides, *J. of Lightwave Technology*, v.17, No.11, 2050-2057 (1999), **ISI times cited 49**

V.N. Astratov, D.M. Whittaker, I.S. Culshaw, R.M. Stevenson, M.S. Skolnick, T.F. Krauss, and R.M. DeLaRue, “Photonic Band Structure Effects in the Reflectivity of Periodically Patterned Waveguides”, *Phys. Rev. B*, v.60, No.24, R16255-16258 (1999), **ISI times cited 85**

Y.A. Vlasov, K. Luterova, I. Pelant, B. Honerlage, and V.N. Astratov, “Enhancement of optical gain of semiconductors embedded in three-dimensional photonic crystals”, *Appl. Phys. Lett.*, v.71, No.12, pp.1616-1618 (1997), **ISI times cited 119**

Y.A. Vlasov, V.N. Astratov, O.Z. Karimov, A.A. Kaplyanskii, V.N. Bogomolov, and A.V. Prokofiev, “Existence of a photonic pseudogap for visible light in synthetic opals”, *Phys. Rev. B*, v.55, No.20, R13357-13360 (1997), **ISI times cited 156**

V.N. Astratov, Y.A. Vlasov, O.Z. Karimov, A.A. Kaplyanskii, Yu.G. Musikin, N.A. Bert, V.N. Bogomolov, and A.V. Prokofiev, “Photonic Band Gaps in 3D Ordered FCC Silica Matrices”, *Physics Letters A*, v.222, 349-353 (1996). **ISI times cited: 45**

V.N. Astratov, V.N. Bogomolov, A.A. Kaplyanskii, A.V. Prokofiev, L.A. Samoilovich, S.M. Samoilovich, and Y.A. Vlasov, “Optical Spectroscopy of Opal Matrices with CdS Embedded in its Pores: Quantum Confinement and Photonic Band Gap Effects”, *Nuovo Cimento D*, v.17, No.11-12, 1349-1354 (1995). **ISI times cited: 119**

Societies

Optical Society of America

The International Society for Optical Engineering SPIE

Sigma Pi Sigma Society

Recent Collaborators

M.S. Skolnick, D.M. Whittaker and A.M. Fox (Univ. of Sheffield), D.J. Brady (Duke), Y.A. Vlasov (IBM), W. Cai (UNCC).

Postdoctoral Researches supervised

- Dr. Andrey M. Kapitonov – Experimental studies of coupled microspheres, UNC-Charlotte, funded by ARO project (9 months) 02.2006-11.2006
- Dr. Andrey V. Kanaev – Theoretical modeling of coupled microspheres, UNC-Charlotte, funded by the Optical Center (DARPA) 2004-2005.
Current employment: Contractor, Navy Research Laboratory
- Dr. Kiran Hiremath – Theoretical modeling of whispering gallery modes, UNC-Charlotte, funded by the Optical Center (DARPA), 11.2006-01.2008.
Current employment: Postdoctoral Fellow, University of Karlsruhe, Germany

Graduate Students supervised

At UNC-Charlotte in 2002-2006:

- Seungmoo Yang – Modeling and experiments on coupled microspheres since 2006, Ph.D. Candidate – Optical Science
- Shashanka Ashili – Coupled microspheres and opals since 2003, Ph.D. in Nov. 2007 (Charlotte).
Current: Biodesign and Innovation Fellow, Univ. of Missouri – Columbia.
- Jason Franchak – Coupled whispering gallery modes in microspheres, M.S. 2004 (Charlotte).
Currently studying to become an Orthodox Priest

At the University of Sheffield in 1997-2001 I was a co-supervisor:

- Alan Bristow – Photonic crystal waveguides, Ph.D. 2003 (Sheffield).
Current employment: Postdoctoral Fellow, JILA, Colorado
- Ali Adawi – Opals, Ph.D. 2002 (Sheffield), Current employment: Postdoc, U. of Sheffield
- Mohammed Emam-Ismail – Semiconductor microcavities, Ph.D. 2002 (Sheffield).
Current employment: University Lecturer, Egypt
- Mark Stevenson – Semiconductor microcavities and photonic crystals, Ph.D. 2000 (Sheffield).
Current employment: Research scientist at Toshiba Cambridge, UK

At A.F. Ioffe Institute in 1992-1997 I was a Leader of the group and a PI in the opal project. My group:

- Yurii Vlasov – Quantum wells and opals, Ph.D. 1995 (Ioffe).
Current: Leader of the group at IBM T.J. Watson Research Center
- Oleg Karimov – Quantum wells and opals, Ph.D. 2000 (U. Bath, UK).
Current employment: Research scientist at Toshiba Cambridge, UK

Graduate Students Committees

- Daryl Purcell - Ph.D. defense committee 2008 (UNC-Charlotte)
- Alessandra Balestreri – Ph.D. external evaluator 2007 (University of Pavia, Italy)
- Paolo Batone – Ph.D. defense committee 2007 (UNC-Charlotte)
- Brent Bergner – Ph.D. thesis committee 2006 (UNC-Charlotte)
- Adam Saltzman – Master's defense committee 2005 (Duke University)
- Jiwen Zhu – Ph.D. defense committee 2005 (UNC-Charlotte)
- Kamran Ahmad – Master's defense committee 2004 (UNC-Charlotte)
- Douglas Canning – Master's defense committee 2004 (UNC-Charlotte)
- Mikhail Turovskiy – Master's defense committee 2004 (UNC-Charlotte)

Undergraduate Students supervised

At the University of Sheffield:

- Agoney Z. Garcia-Deniz, final year project on opals, Physics major 2001
- Sukhvinder Phalora, final year project on opals, Physics major 2001
- Mark Thompson, final year project on opals, Physics major 2000
- Robert MacNaughton, final year project on opals, Physics major 2000
- Sebastian Fricker, summer project on opals, exchange student from Ecole Polytechnique 2000

At A.F. Ioffe Institute:

- Tatiana Alvares, final year project on quantum wells, Physics major, St.Petersburg State University 1994

Research Grants

- 2008-11 *Mesoscale Structures and Photonic Devices based on Coupled Spherical Cavities*, NSF Grant No. ECCS-0824067, PI, Total \$296,647
- 2007 *Resonant Optical Circuits Based on Coupling Between Whispering Gallery Modes in Dielectric Microresonators*, ARO Grant No. W911NF-05-1-0529, PI, Total \$65,000
- 2005-06 *Resonant Optical Circuits Based on Coupling Between Whispering Gallery Modes in Dielectric Microresonators*, ARO Grant No. W911NF-05-1-0529, PI, Total \$85,000
- 2005-08 *High Order Numerical Methods for Light Propagation in Micro-Photonics*, NSF Grant No. CCF 0513179, Co-PI, Total \$180,000
- 2004 *Synthetic Opals for Multimodal Spectroscopy of Diffusive Sources of Light*, Duke University, PI, Total \$20,000
- 2007-08 *Fundamentals and Applications of Coupled Cavities with Whispering Gallery Modes*, UNCC Faculty Research Grant, PI, Total \$6,000
- 2004-06 *Optical Transport Properties of Circuits Formed by Coupled Microresonators*, UNCC Faculty Research Grant, PI, Total \$6,000
- 2002-04 *Coupled Microspheres Waveguides*, UNCC Faculty Research Grant, PI, Total \$6,000
- 2000-01 *EM Properties, Band Structure and Light Matter Interaction in Semiconductor Photonic Crystals*, EPSRC grant No. GR/M72951 (in the UK). Because of the EPSRC rules I was not able to be a Co-PI since I was not a permanent member of staff, but I made major contributions to this proposal, Total £162,000
- 1996 Award of the Program of Exchange Visits, Royal Society, Total £3,000
- 1995-97 *Photonic Band Gaps in Opals*, Russian Fund for Basic Research grant No. 960217928-a, PI, Total is equivalent to \$20,000

Teaching Experience

1. UNC-Charlotte:
 - *Optical Materials I*, graduate course OPTI6105/8105 – Spring 2005
 - *Light Sources and Detectors*, graduate course PHYS6000C03/PHYS6241 – Spring 2004, Fall 2002
 - *Quantum Theory I*, graduate course PHYS6141 Spring 2002
 - *Physics for Science and Engineering*, undergraduate course PHYS2102 (100 students class) – 2003-08
 - *Physics for Science and Engineering II Laboratory*, PHYS2102-L12, Spring 2003
 - *Introductory lecture on photonic crystals*, CHEM 6090/8090, Spring 2004, Spring 2007
2. First year physics tutorials at the University of Sheffield in 1997-2001.
3. North-West State Technical University, St.-Peterburg, Russia, 1992-1997:
 - *Optoelectronics*, graduate course – Spring 1997. I selected topics and problems, developed laboratory settings and wrote laboratory manual for this course:
V.N. Astratov, *Optoelectronics: program, exams and laboratory manual*, edited by North-West State Technical University, St.-Petersburg, Russia, 48 pages, 1997
 - *Microwave and Quantum devices*, graduate course taught several times in 1992-1997
 - *Principles of Electronic Devices*, upper undergraduate course taught several times in 1992-1997

Referred Journal Articles (67)

Whispering Gallery Modes and Coupled Cavities

1. **Photonic Nanojet-Induced Modes in Chains of Size-Disordered Microspheres with an Attenuation of only 0.08 dB per Sphere**
S. Yang and V.N. Astratov, *Appl. Phys. Lett.* **92**, 261111 (2008).
Selected for the Virtual Journal of Nanoscale Science & Technology **18**, Issue 2 (2008).
2. **Perturbations of Whispering Gallery Modes by Nanoparticles Embedded in Microcavities**
K.R. Hiremath and V.N. Astratov, *Opt. Express* **16**, 5421-5426 (2008).
Selected for the Virtual Journal for Biomedical Optics **3**, Issue 3 (2008).
3. **Editorial: Introduction to the Focus Issue of Optics Express on Physics and Applications of Microresonators**
V.N. Astratov, *Opt. Express* **15**, 17171 (2007).
Selected for the Virtual Journal for Biomedical Optics **3**, Issue 1 (2008).
4. **Percolation of Light through Whispering Gallery Modes in 3D Lattices of Coupled Microspheres**
V.N. Astratov and S.P. Ashili, Focus Issue on Physics and Applications of Microresonators, *Opt. Express* **15**, 17351-17361 (2007).
Selected for the Virtual Journal of Nanoscale Science & Technology **17**, Issue 10 (2008).
5. **Whispering Gallery Resonances in Semiconductor Micropillars**
V.N. Astratov, S. Yang, S. Lam, B.D. Jones, D. Sanvitto, , D.M. Whittaker, A.M. Fox, and M.S. Skolnick, A. Tahraoui, P.W. Fry, and M. Hopkinson, *Appl. Phys. Lett.* **91**, 071115 (2007).
6. **Observation of Nanojet-Induced Modes with Small Propagation Losses in Chains of Coupled Spherical Cavities**
A.M. Kapitonov and V.N. Astratov, *Opt. Lett.* **32**, 409-411 (2007).
7. **The Effects of Inter-Cavity Separation on Optical Coupling in Dielectric Bispheres**
S.P. Ashili, V.N. Astratov, and E.C.H. Sykes, *Optics Express* **14**, 9460-9466 (2006).
8. **Optical Coupling at a Distance Between Detuned Spherical Cavities**
A.V. Kanaev, V.N. Astratov, and W. Cai, *Appl. Phys. Lett.* **88**, 111111 (2006).
9. **Numerical Study of Light Propagation via Whispering Gallery Modes in Microcylinder Coupled Resonator Optical Waveguides,**
S. Deng, W. Cai, and V.N. Astratov, *Optics Express* **12**, 6468-6480 (2004).
10. **Optical Coupling and Transport Phenomena in Chains of Spherical Dielectric Microresonators with Size Disorder**
V.N. Astratov, J.P. Franchak, and S.P. Ashili, *Appl. Phys. Lett.* v. **85**, 5508-5510 (2004).

Opals

11. **Interplay of Order and Disorder in the Optical Properties of Opal Photonic Crystals**
V.N. Astratov, A.M. Adawi, S. Fricker, M.S. Skolnick, D.M. Whittaker, and P.N. Pusey, *Phys. Rev. B* **66**, 165215 (2002).
12. **Opal Photonic Crystals Infiltrated with Chalcogenide Glasses**
V.N. Astratov, A.M. Adawi, M.S. Skolnick, V.K. Tikhomirov, V. Lyubin, D.G. Lidzey, M. Ariu, and A.L. Reynolds, *Appl. Phys. Lett.*, **78**, 4094-4096 (2001).
13. **Manifestation of Intrinsic Defects in Optical Properties of Self-Organized Opal Photonic Crystal**
Y.A. Vlasov, V.N. Astratov, A.V. Baryshev, A.A. Kaplyanskii, O.Z. Karimov, and M.F. Limonov, *Phys. Rev. E* **61**, 5784-5793 (2000).
14. **Optical Gain of CdS Quantum Dots Embedded in a 3D Photonic Crystals**
Y.A. Vlasov, K. Luterova, I. Pelant, B. Honerlage, and V.N. Astratov, *Thin Solid Films* **318**, 93-95 (1998).
15. **Optical Gain and Lasing in a Semiconductor Embedded in a Three-Dimensional Photonic Crystal**
Y.A. Vlasov, K. Luterova, I. Pelant, B. Honerlage, and V.N. Astratov, *Journal of Crystal Growth*, **185**, 650-653 (1998).
16. **Response to “Comments on ‘Enhancement of the Optical Gain of Semiconductors Embedded in Three-Dimensional Photonic Crystals’”**
Y.A. Vlasov, K. Luterova, I. Pelant, B. Honerlage, and V.N. Astratov, *Appl. Phys. Lett.* **73**, 552 (1998).

17. Enhancement of Optical Gain of Semiconductors Embedded in Three-Dimensional Photonic Crystals

Y.A. Vlasov, K. Luterova, I. Pelant, B. Honerlage, and V.N. Astratov, *Appl. Phys. Lett.* **71**, 1616-1618 (1997).

18. Existence of a Photonic Pseudogap for Visible Light in Synthetic Opals

Y.A. Vlasov, V.N. Astratov, O.Z. Karimov, A.A. Kaplyanskii, V.N. Bogomolov, and A.V. Prokofiev *Phys. Rev. B* **55**, R13357-13360 (1997).

19. Photonic Band Structure of 3D Ordered Silica Matrices

V.N. Astratov, Y.A. Vlasov, O.Z. Karimov, A.A. Kaplyanskii, Yu.G. Musikin, N.A. Bert, V.N. Bogomolov, and A.V. Prokofiev, *Superlattices and Microstructures* **22**, 393-397 (1997).

20. Photonic Band Gaps in 3D Ordered FCC Silica Matrices

V.N. Astratov, Y.A. Vlasov, O.Z. Karimov, A.A. Kaplyanskii, Yu.G. Musikin, N.A. Bert, V.N. Bogomolov, and A.V. Prokofiev, *Physics Letters A* **222**, 349-353 (1996).

21. Optical Spectroscopy of Opal Matrices with CdS Embedded in its Pores: Quantum Confinement and Photonic Band Gap Effects

V.N. Astratov, V.N. Bogomolov, A.A. Kaplyanskii, A.V. Prokofiev, L.A. Samoilovich, S.M. Samoilovich, and Y.A. Vlasov, *Nuovo Cimento D* **17**, 1349-1354 (1995).

Photonic Crystal Waveguides

22. Defect States and Commensurability in Dual-Period $Al_xGa_{1-x}As$ Photonic Crystal Waveguides

A.D. Bristow, D.M. Whittaker, V.N. Astratov, M.S. Skolnick, A. Tahraoui, T.F. Krauss, M. Hopkinson, M.P. Croucher, and G.A. Gehring, *Phys.Rev.B* **68**, 033303 (2003).

23. Polarization Conversion in the Reflectivity Properties of Photonic Crystal Waveguides

A.D. Bristow, V.N. Astratov, R. Shimada, I.S. Culshaw, M.S. Skolnick, D.M. Whittaker, A. Tahraoui, and T.F. Krauss, *IEEE J.of Q.El.* **38**, 880-884 (2002).

24. Photonic Bandstructure of Patterned Waveguides with Dielectric and Metallic Cladding

D.M.Whittaker, I.S.Culshaw, V.N.Astratov, and M.S.Skolnick, *Phys.Rev.B* **65**, 073102 (2002).

25. Heavy Photon Dispersions in Photonic Crystal Waveguides

V.N. Astratov, R.M. Stevenson, I.S. Culshaw, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R.M. De La Rue, *Appl. Phys. Lett.* **77**, 178-180 (2000).

26. Reflectivity Studies of Photonic Band Structure Effects in Two-Dimensional Air/Semiconductor Lattices

V.N. Astratov, R.M. Stevenson, I.S. Culshaw, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R. M. De La Rue, *Phys. Status Solidi (a)* **178**, 565-569 (2000).

27. Determination of the Band Structure of Photonic Crystal Waveguides

I.S. Culshaw, V.N. Astratov, R.M. Stevenson, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R.M. De La Rue, *Physica E* **7**, 650-655 (2000).

28. Photonic Band Structure Effects in the Reflectivity of Periodically Patterned Waveguides

V.N. Astratov, D.M. Whittaker, I.S. Culshaw, R.M. Stevenson, M.S. Skolnick, T.F. Krauss, and R.M. DeLaRue, *Phys. Rev. B* **60**, R16255-16258 (1999).

29. Resonant Coupling of Near-Infrared Radiation to Photonic Band Structure Waveguides

V.N. Astratov, I.S. Culshaw, R.M. Stevenson, D.M. Whittaker, M.S. Skolnick, T.F. Krauss, and R.M. DeLaRue, *J. of Lightwave Technology* **17**, 2050-2057 (1999).

30. Experimental Technique to Determine the Band Structure of Two-Dimensional Photonic Lattices

V.N. Astratov, R.M. Stevenson, M.S. Skolnick, D.M. Whittaker, S. Brand, I.S. Culshaw, T.F. Krauss, R.M. DeLaRue, and O.Z. Karimov, *IEE Proceedings-Optoelectronics* **145**, 398-402 (1998).

Semiconductor Quantum Microcavities

31. Uncoupled Excitons in Semiconductor Microcavities Detected in Resonant Raman Scattering

R.M. Stevenson, V.N. Astratov, M.S. Skolnick, J.S. Roberts, and G. Hill, *Phys.Rev.B* **67**, 081301(R) (2003).

32. Transition from Strong to Weak Coupling and the Onset of Lasing in Semiconductor Microcavities

- R. Butte, G. Delalleau, A.I. Tartakovskii, M.S. Skolnick, V.N. Astratov, J.J. Baumberg, G. Malpuech, A. Di Carlo, A.V. Kavokin, and J.S. Roberts, *Phys.Rev.B* **65**, 205310 (2002).
- 33. Polariton-Polariton Interactions and Stimulated Scattering in Semiconductor Microcavities**
M.S. Skolnick, R.M. Stevenson, A.I. Tartakovskii, R. Butte, M. Emam-Ismael, D.M. Whittaker, P.G. Savvidis, J.J. Baumberg, A. Lemaitre, V.N. Astratov, J.S. Roberts, *Mat. Sci. Eng.C-Biomimetic and Supramolecular Systems* **19**, 407-416 (2002).
- 34. Continuous Wave Observation of Massive Polariton Redistribution by Stimulated Scattering in Semiconductor Microcavities**
R.M. Stevenson, V.N. Astratov, M.S. Skolnick, D.M. Whittaker, M. Emam-Ismael, A.I. Tartakovskii, P.G. Savvidis, J.J. Baumberg, and J.S. Roberts, *Phys. Rev. Lett.* **85**, 3680-3683 (2000).
- 35. Asymmetric Photoluminescence Spectra from Excitons in a Coupled Microcavity**
M. Emam-Ismael, V.N. Astratov, M.S. Skolnick, D.M. Whittaker, and J.S. Roberts, *Phys. Rev. B* **62**, 1552-1555 (2000).
- 36. Exciton-Polaritons in Single and Coupled Microcavities**
M.S. Skolnick, V.N. Astratov, D.M. Whittaker, A. Armitage, M. Emam-Ismael, R.M. Stevenson, J.J. Baumberg, J.S. Roberts, D.G. Lidzey, T. Virgili, and D.D.C. Bradley, *J. of Luminescence* **87-89**, 25-29 (2000).
- 37. Spatial Coherence of Polaritons in Semiconductor Microcavities**
A.I. Tartakovskii, D.N. Krizhanovskii, V.D. Kulakovskii, N.A. Gippius, S.G. Tikhodeev, M.S. Skolnick, V.N. Astratov, and J.S. Roberts, *Phys.Status Solidi* (b) **221**, 163-167 (2000).
- 38. Relaxation bottleneck and its suppression in semiconductor microcavities**
A.I. Tartakovskii, M. Emam-Ismael, R.M. Stevenson, M.S. Skolnick, V.N. Astratov, D.M. Whittaker, J.J. Baumberg, and J.S. Roberts, *Phys. Rev. B* **62**, R2283-R2286 (2000).
- 39. Nonlinearities in Emission from the Lower Polariton Branch of Semiconductor Microcavities**
A.I. Tartakovskii, V.D. Kulakovskii, D.N. Krizhanovskii, M.S. Skolnick, V.N. Astratov, A. Armitage, and J.S. Roberts, *Phys. Rev. B* **60**, R11293-11296 (1999).
- 40. Nonlinear Effects in Semiconductor Microcavity Polariton Emission**
V.D. Kulakovskii, A.I. Tartakovskii, D.N. Krizhanovskii, A. Armitage, J.S. Roberts, V.N. Astratov, and M.S. Skolnick, *Phys.Status Solidi* (a) **178**, 381-384 (2000).
- 41. Exciton-Light Coupling in Single and Coupled Microcavities: Polariton Dispersion and Polarisation Splitting**
G. Panzarini, L.C. Andreani, A. Armitage, D. Baxter, M.S. Skolnick, V.N. Astratov, J.S. Roberts, A.V. Kavokin, M.V. Vladimirova, and M.A. Kaliteevski, *Phys. Rev. B* **59**, 5082-5089 (1999).
- 42. Cavity-Polariton Dispersion and Polarisation Splitting in Single and Coupled Semiconductor Microcavities**
G. Panzarini, L.C. Andreani, A. Armitage, D. Baxter, M.S. Skolnick, V.N. Astratov, J.S. Roberts, A.V. Kavokin, M.V. Vladimirova, and M.A. Kaliteevski, *Phys. of the Solid State* **41**, 1223-1238 (1999).
- 43. Optically Induced Splitting of Bright Excitonic States in Coupled Quantum Microcavities**
A. Armitage, M.S. Skolnick, V.N. Astratov, D.M. Whittaker, G. Panzarini, L.C. Andreani, T.A. Fisher, J.S. Roberts, A.V. Kavokin, M.A. Kaliteevski, and M.R. Vladimirova, *Phys. Rev. B* **57**, 14877-14881 (1998).
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Invited Talks at the Conferences (14)

1. **Photonics West 2008**, San Jose, January 19-24, 2008
“Optical transport in coupled spherical cavities with tunable whispering gallery modes”
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7. **Major National OSA Meeting: Frontiers in Optics, 89th OSA Annual Meeting**, Tucson, Arizona, October 16-20, 2005
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13. **European Research Conference on Photonic and Electromagnetic Crystal Structures (PECS-3)**, St. Andrews, Scotland, UK, 9-14 June 2001
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14. **3rd Biennial Russian Semiconductor Physics Conference**, Moscow, Russia, 1-5 December 1997
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Presentations at Conferences personally given by V.N. Astratov (32)

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- “High-Quality-Factor Whispering Gallery Modes in Semiconductor Microcavity Pillars with Circular and Elliptical Cross Section” (with S. Yang, S. Lam, B.D. Jones, D. Sanvitto, , D.M. Whittaker, A.M. Fox, and M.S. Skolnick, A. Tahraoui, P.W. Fry, and M. Hopkinson)
2. **Talk: CLEO/QELS 2007**, Baltimore, May 6-11, 2007
“Percolation of Light in 3D Lattices of Coupled Microspheres” (with S.P. Ashili)
 3. **Talk: Photonics West 2007**, San Jose, January 20-26, 2007
 4. **Talk: Frontiers in Optics, 90th OSA Annual Meeting**, Rochester, October 8-12, 2006
“Observation of Light Propagation via Whispering Gallery Modes in 3-D Networks of Coupled Spherical Cavities” (with S.P. Ashili and A.M. Kapitonov), Program, p. 92.
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“Observation of Whispering Gallery Resonances in Circular and Elliptical Semiconductor Pillar Microcavities” (with S. Lam, D. Sanvitto, J.A. Timpson, A. Tahraoui, D.M. Whittaker, and M.S. Skolnick), Program, p. 168.
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 7. **Talk: CLEO/IQEC 2005 Conference of OSA**, Baltimore, May 22-27, 2005
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“Experimental Measurement of Energy Versus Wavevector Dispersion Curves of Semiconductor Two Dimensional Photonic Lattices” (with R.M. Stevenson, O.Z. Karimov, M.S. Skolnick, T.F. Krauss, R.M. De La Rue, and S. Brand), Abstracts of 24th ICPS, Th2-D4, 1998.
- 24. Poster: Condensed Matter and Material Physics Conference**, Exeter, UK, 17-19 December 1997
“Resonant Raman Scattering from Semiconductor Quantum Microcavities” (with D. Baxter, W.R. Tribe, R.M. Stevenson, M.S. Skolnick, D.J. Mowbray, and J.S. Roberts), Abstracts of CMMP’97, p.103.
- 25. Talk: 23rd International Symposium on Compound Semiconductors**, St.-Petersburg, Russia, 23-27 September 1996
“Influence of Refractive Index Contrast on Photonic Band Gap in 3-D Periodic SiO₂ Matrices Filled with a Semiconductor” (with Y.A. Vlasov, V.N. Bogomolov, A.A. Kaplyanskii, O.Z. Karimov, D.A. Kurdjukov, and A.V. Prokofiev), Abstracts of ISCS-23, 1996.
- 26. Poster: 23rd International Symposium on Compound Semiconductors**, St.-Petersburg, Russia, 23-27 September 1996
“Spectroscopy Studies of P-Type GaAs/AlGaAs MQWs Heavily Doped with Carbon” (with O.Z. Karimov, Y.A. Vlasov, E. Mao, S. Dickey, B.W. Kim, and A. Majerfeld), Abstracts of ISCS-23, 1996
- 27. Poster: 23th International Conference on the Physics of Semiconductors**, Berlin, Germany, 21-26 July 1996
“Spectroscopic Study of 3D Ordered Porous Silica Matrices Filled by Semiconductor Microcrystals: Photonic Band Structure and Radiative Properties” (with Y.A. Vlasov, O.Z. Karimov, A.A. Kaplyanskii, V.N. Bogomolov, A.A. Kaplyanskii, O.Z. Karimov, D.A. Kurdjukov, and A.V. Prokofiev), Abstracts of ICPS-23, 1996.
- 28. Poster: 9th International Symposium on Superlattices, Microstructures and Microdevices**, Liege, Belgium, July 1996
“Photonic Band Structure of 3D Ordered Silica Matrices” (with Y.A. Vlasov, O.Z. Karimov, A.A. Kaplyanskii, Y.G. Musikhin, N.A. Bert, V.N. Bogomolov, and A.V. Prokofiev), Abstracts of the 9th ISSMM, p.123, 1996.
- 29. Talk: 2nd Biennial Russian Semiconductor Physics Conference**, St.-Petersburg, Russia, March 1996

- “Photonic Band Gap Effect in Synthetic Opals” (with A.A. Kaplyanskii, V.N. Bogomolov, A.V. Prokofiev, N.A. Bert, Y.G. Musikhin, and Y.A. Vlasov), Abstracts of the 2nd Russian CPS, p.121, 1996.
- 30. Talk: 2nd International Workshop “Expert Evolution of New Materials for Technological Applications”**, Parma, Italy 18-20 May 1994
“MQW Probe Technique with Wedge-Like Structures for Characterisation of Post-Growth Processing” (with O.Z. Karimov, Y.A. Vlasov), Abstracts of the 2nd Int. Workshop EXTMATEC 1994, p.20.
- 31. Poster: 17th International Conf. on Defects in Semiconductors**, Gmunden, Austria, July 1993
“Exciton Spectroscopy of Near-Surface GaAs/AlGaAs Quantum Wells” (with Y.A. Vlasov), Abstracts of the ICDS-17, 171, 1993.
- 32. Poster: 13th General Conf. of Cond. Matter Division of European Physical Society**, Regensburg, Germany, April 1993
“Photoluminescence of Near-Surface GaAs/AlGaAs Quantum Wells” (with Y.A. Vlasov), Abstracts of the 13th General Conference of CMD EPS, (European Conf. Abstracts) 17a, p.1432, 1993.

Invited Seminars (37)

- 1. University of Wisconsin-Milwaukee**, Physics Department, Milwaukee, WI, October 31, 2008, hosts: V.V. Yakovlev/V. Raicu
“Mesoscale Photonics: Novel Optical Properties and Applications of Coupled Spherical Microresonators”
- 2. Virginia Tech**, Materials Science and Engineering, Blacksburg, VA, October 17, 2008, host: L.V.Asryan
“Mesophotonics: Novel Optical Effects in Coupled Microspheres”
- 3. European Laboratory for Nonlinear Spectroscopy (LENZ)**, Florence, July 5, 2007, host: M. Gurioli
“Optical Transport Phenomena in Coupled Spherical Cavities”.
- 4. University of St. Andrews**, School of Physics and Astronomy, UK, July 3, 2006, host: T.F. Krauss
“Photonic Integrated Circuits Formed by Optically Coupled Spherical Cavities”.
- 5. CoreCom Company affiliated with Politecnico di Milano and Pirelli**, Milan, Italy, June 28, 2006, host: A. Melloni
“Circuits of Optically Coupled Microspheres with Whispering Gallery Modes for Photonic Applications”.
- 6. University of Pavia**, Department of Physics, Pavia, Italy, June 27, 2006, host: L.C. Andreani
“Circuits of Optically Coupled Spherical Cavities with Ultra High Quality Whispering Gallery Modes for Photonics Applications”.
- 7. University of Southampton**, School of Physics and Astronomy, UK, June 9, 2006, host: J.J. Baumberg
“Optical Transport Properties of Circuits of Coupled Spherical Cavities”.
- 8. University of Dortmund**, Department of Physics, Germany, June 2, 2006, host: U. Woggon
“Photonic Integrated Circuits Formed by Optically Coupled Spherical Cavities”.
- 9. University of Sheffield**, Department of Physics and Astronomy, May 17, 2006, host: M.S. Skolnick
“Integrated Circuits of Coupled Microspheres for Optoelectronics Applications”.
- 10. Norfolk State University**, Material Science Research Seminar Series, VA, USA, September 2, 2005, host: M.A. Noginov
[“Photonic Integrated Circuits Formed by Coupled Ultra High-Q Spherical Cavities”](#)
- 11. Duke University**, (Fitzpatrick Center), NC, USA, November 10, 2004, host: D. Brady
[“Photonic Molecules and Crystals formed by Spherical Dielectric Atoms”](#)
- 12. Clemson University**, (Center for Opt. Mater. Sci. & Eng. Technol.), SC, USA, August 15, 2002, host: J. Ballato
“Optical Properties, Band Structure and Light-Matter Coupling in Photonic Crystals”.
- 13. University of North Carolina at Charlotte** (Optoelectronics Center), NC, USA, March 19, 2002, host: M. Fiddy
“Optical Properties, Band Structure and Light-Matter Coupling in Photonic Crystals”.
- 14. University of Pavia**, Department of Physics, Pavia, Italy, October 9, 2001, host: L.C. Andreani

- “Optical Properties, Band Structure and Light-Matter Coupling in Photonic Crystals”.
15. **University of Bath**, Department of Physics, Bath, UK, July 3, 2001, host: P.St.J.Russell
“Photonic Crystals: Optical Properties, Band Structure and Light-Matter Interactions”.
 16. **Research Center COM, Technical University of Denmark**, Lyngby, Denmark, May 4, 2001, host: J.M.Hvam
“Modern Optics of Photonic Crystals”.
 17. **Queens College of City University of New York**, Flushing, NY, USA, April 20, 2001, host: A.Z. Genack
“Photonic Bandgap Materials”.
 18. **University of North Carolina at Charlotte**, Charlotte, North Carolina, USA, March 30, 2001, host: F.Farahi
“Synthetic Opals and Semiconductor Photonic Crystals”.
 19. **Worcester Polytechnic Institute**, Worcester, Massachusetts, USA, March 19, 2001, host: T.H.Keil
“Modern Optics of Photonic Crystals”.
 20. **Oregon State University**, Corvallis, Oregon, USA, host: D.H.McIntyre
“Semiconductor Photonic Crystals”, March 1, 2001
“Photonic Crystals and Synthetic Opals”, February 28, 2001
 21. **University of Cincinnati**, Cincinnati, Ohio, USA, host: L.M.Smith
“The Magical World of Photonic Crystals”, February 26, 2001
 22. **Optical Switch Corporation – HLS Division**, Bedford, Massachusetts, USA, July 26, 2000, host: G.Sonek
“Photonic Crystals and their Applications”
 23. **Optical Switch Corporation**, Richardson, Texas, USA, July 28, 2000, host: G.P.Nabhan
“Photonic Crystal Waveguides”
 24. **University of Edinburgh**, Dep. of Physics and Astronomy, Edinburgh, UK, May 16, 2000, host: P.N.Pusey
“Photonic Crystals, Control of Photons and their Interaction With Matter” (with M.S.Skolnick)
 25. **University of Exeter**, Dep. of Physics, Exeter, UK, February 18, 2000, host: W.L.Barnes
“Band Structure Effects in Optical Properties of Photonic Crystals: Photonic Waveguides and Synthetic Opals”
 26. **Cavendish Laboratory**, Cambridge, UK, November 9, 1999, host: R.T.Phillips
“Optical Spectroscopy of Photonic Crystals: Semiconductor Patterned Waveguides and Synthetic Opals”
 27. **Clarendon Laboratory**, University of Oxford, UK, April 1999, host: M.Campbell
“Optical Properties of Novel Photonic Microstructures: Opals and Photonic Crystal Waveguides”
 28. **University of Utah**, Salt Lake City, USA, January 11, 1999, host: Z.V.Vardeny
“Spectroscopy of Novel Photonic Microstructures”
 29. **International Winter School on Semiconductor Physics organised by A.F.Ioffe Institute**, Zelenogorsk, Russia, March 1-5, 1997, Abstracts, p.2 (invited lecture)
“Three Dimensional Photonic Crystals”
 30. **Instituto Metodologie Avanzate Inorganiche**, Roma, Italy, December 1996, host: A.D’Andrea
“Reflectance Spectroscopy of Heavily Doped P-Type GaAs/AlGaAs QWs”
 31. **University of Sheffield**, Dep. of Physics and Astronomy, Sheffield, UK, November 1996, host: M.S.Skolnick
“Synthetic Opals – Photonic Crystals for Visible Light”
 32. **University of Glasgow**, Dep. of Electronics and El. Engin., Glasgow, UK, November 1996, host: R.M.De La Rue
“Photonic Band Structure of Synthetic Opals”
 33. **A.F.Ioffe Institute Seminar on Low-Dimensional Structures**, March 1995, host E.L.Ivchenko
“Photonic Crystals” and “Photonic Band Gap Effect in Synthetic Opals”
 34. **University “La Sapienza”**, Physics Department, Roma, Italy, May 1994, host: A.Frova
“Photoinduced Charge Build-up Processes in Structures with Near-Surface GaAs/AlGaAs Quantum Wells”
 35. **Instituto Metodologie Avanzate Inorganiche**, Roma, Italy, May 1994, host: A.D’Andrea
“Photoluminescence Properties of Near-Surface GaAs/AlGaAs Quantum Wells”

36. **Max-Planck-Institute**, Stuttgart, Germany, April 1993, host: W.W.Ruhle
“Surface Quantum Wells as a Photoluminescence Probe of Near-Surface Electric Field”
37. **University of Stuttgart, IV Physical Institute**, Stuttgart, Germany, April 1993, host: H.Schweizer
“Optical Spectroscopy of Near-Surface GaAs/AlGaAs Quantum Wells”