



PROF. DR. ANDREI B. KLIMOV

**QUNTUM OPTICS GROUP
DEPARTMENT OF PHYSICS, GUADALAJARA UNIVERSITY**

Main research topics

- *Nonlinear dynamics of quantum optical systems.*
- *Algebraic methods in quantum optics, including perturbation and quasiclassical methods.*
- *Theory of quasidistribution functions and semiclassical dynamics of quantum optical systems.*
- *Effective Hamiltonians and effective processes in quantum optical systems.*
- *Dissipation and decoherence in quantum optical systems.*
- *Polarization measures for quantum states of light.*
- *Finite quantum systems. Mutually unbiased basis. Discrete Wigner function. Quantum tomography.*
- *Quantum mechanics and quantum electrodynamics of nonstationary and confined systems*

Members of the group

Dr. Andrei Klimov (SNI III)
Dr. Sergei Chumakov (SNI II)
Dr. José Luis Romero Ibarra (SNI I)
Dr. Pedro Espinoza Padilla (SNI I) (Centro Universitario de los Lagos, UdeG)
Dr. Carlos Muñoz Villegas (postdoc)
MC Andrés García (PhD student)

Personal information

Born 26.08.1964, Russia

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Graduated from Moscow Physics and Technical Institute (Russia) (1981-1987), Master of Science (honor diploma).

Ph.D. degree from Moscow Physics and Technical Institute (Theoretical Physics) (1987-1991).

Research experience

1991-1992 researcher (P.N. Lebedev Physical Institute, Moscow).

1991-1992 assistant professor (Theoretical Physics Department, Moscow Physics and Technical Institute).

1992-1993 researcher, "Asociado C", Institute of Physics, Universidad Nacional Autonoma de Mexico (Mexico).

1993-1994 Profesor - Investigador Titular "B", Department of Physics, University of Guadalajara (Mexico).

since 1994 Profesor - Investigador Titular "C" (full profesor), Department of Physics, University of Guadalajara (Mexico).

Distinctions

Member of Sistema Nacional de Investigadores (Mexico): Level I (1993-1999); Level II (1999-2005), Level III (since 2005).

Research interests

Quantum optics (in particular, cavity quantum electrodynamics, quantum mechanics and quantum electrodynamics of nonstationary and confined systems). Algebraic methods in quantum optics. Theory of quasidistribution functions. Quasiclassical methods in quantum optics. Finite quantum systems.

Total number of publications **130**, including refereed journals **93**, books **3**, book chapters **2**, proceedings **29**, *h*-index: **14**

Individual research grants

1. "Coherence and decoherence in quantum optics", supported by National Council of Science and Technology (CONACyT), Mexico, 1996-1998

2. "Quantum information and collective interactions", supported by National Council of Science and Technology (CONACyT), Mexico, 2000-2002

3. "Quantum polarization" (STINT, Sweden), 2004-2008 (co-responsible).

4. "Nonlinear dynamics in processing and transmitting of quantum information" supported by National Council of Science and Technology (CONACyT), Mexico, 2005-2008.

Teaching experience

Special courses: Advanced and basic courses in classical and quantum mechanics, electrodynamics, asymptotic methods in mathematical physics, quantum optics, Lie group theory and its applications.

General courses: Differential and integral calculus, Linear algebra.

Coordinator of the Ph.D. Degree Program (Theoretical physics) Department of Physics, University of Guadalajara (Mexico).

Supervision : 3 bachelor and 9 master degree thesis, 5 Ph.D. students

PhD thesis

1. José Luis Romero Ibarra: "Disipación en modelos ópticos y su aplicación en sistemas de información cuántica" (2004)
2. Pedro Basilio Espinoza Padilla: "Método de las funciones de cuasidistribución para análisis de sistemas ópticos"(2004)
3. Isabel Sainz Abascal, "Procesos virtuales y no resonantes en sistemas ópticos" (2005)
4. Omar Aguilar Loreto, "Tomografía y control en sistemas atómicos de tres niveles de energía" (2006)
5. Carlos Muñoz Villegas: "Phase-space structure and Wigner function in dimensions power of prime" (2007)

Master degree thesis

1. Edith Castillo Corona: "Dinámica cuántica del modelo de Dicke no resonante y no estacionario". (1997)
2. Rafael Farías Gonzalez: "Modelo de dicke de dos fotones". (1998)
3. José Ruric Farías Mansilla: Fluorescencia resonante en el modelo de Dicke con disipación" (1999)
4. José Luis Romero Ibarra: "Información cuántica: realización en cavidades"(2000)
5. Isabel Sainz Abascal: " Interacción campo-átomo en un medio atómico no resonante", (2002)
6. Disuke Shindo: "Compresión atómica en el modelo de Dicke dispersivo bajo la perturbación por un tren de pulsos", (2002)
7. Eva Ivonne Torres Chávez: "Generación de estados atómicos comprimidos en proceso de interacción campo-átomo" (2004)
8. Carlos Muñoz Villegas: "Calculo simbólico sobre campos algebraicos" (2004)
9. Antonio Navarro Pacheco: "Método de Hamiltonianos efectivos en óptica cuántica" (2006)

Bachelor degree thesis

1. Víctor Altuzar Aguilar: "Espectro de radiación de fotones generados dentro de una cavidad con paredes en movimiento" (1996)
2. Pedro Basilio Espinoza Padilla: "Diamagnetismo cuántico con disipación"(1998)
3. José Luis Romero Ibarra: "Aproximación de la función de onda al modelo de Dicke" (1998)

PhD thesis in process

1. Andres García "Symplectic group approach to MUBs and the discrete phase-space geometry"

Scientific visits

- Department of Physics, University of Concepcion (Chile) (1996)
- Department of Physics, University of Concepcion (Chile) (1997)
- Department of Physics, Federal University of Sao Carlos, (Brasil) (1997)
- Department of Theoretical Physics, University of Valladolid (Spain) (1998)
- Department of Physics, University of Concepcion (Chile) (1998)
- Department of Optics, Universidad Complutense de Madrid (Spain) (1999)
- Department of Mathematical Physics, University of Liege (Belgium) (1999)

- Department of Optics, Universidad Complutense de Madrid (Spain) (2000)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2001)
- Department of Physics, Universidad de University of Concepcion (Chile) (2001)
- Department of Physics, University of Concepcion (Chile) (2002)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2002)
- Departamento de Óptica, Universidad Complutense de Madrid (España) (1999)
- Departamento de Física Matemática, Universidad de Liege (Belgica) (1999)
- Departamento de Óptica, Universidad Complutense de Madrid (España) (2000)
- Departamento de Óptica, Universidad Complutense de Madrid (España) (2001)
- Departamento de Física, Universidad de Concepción (Chile) (2001)
- Departamento de Física, Universidad de Concepción (Chile) (2002)
- Departamento de Óptica, Universidad Complutense de Madrid (España) (2002)
- Department of Physics, Lakehead University (Canada) (2002)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2003)
- Department of Physics, Lakehead University (Canada) (2003)
- Department of Physics, Universidad de Concepción (Chile) (2003)
- Department of Physics, Universidad de Concepción (Chile) (2004)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2004)
- Department of Physics, Lakehead University (Canada) (2004)
- Department of Physics, Universidad de Concepción (Chile) (2004)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2005)
- Department of Microelectronics, Royal Institute of Technology (Sweden) (2005)
- Department of Physics, Universidad de Concepción (Chile) (2004)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2006)
- Department of Microelectronics, Royal Institute of Technology (Sweden) (2006)
- Max Plank Institute fur Optics (Erlangen, Germany) (2006)
- Department of Physics, Lakehead University (Canada) (2007)
- Department of Optics, Universidad Complutense de Madrid (Spain) (2007)
- Departamento de Física, Universidad Católica de Chile, (Chile) (2007)

Referee of journals

Journal of Physics A, Journal of Physics B, Revista Mexicana de Física, Physics Letters A, Optics Letters, Optics Express, Journal of Russian Laser Research, Physical Review B, Physical Review Letters.

Member of Editorial Board

Journal of Russian Laser Research

Participacion in International Congreses

- "Physical significance of correlated and squeezed states", XVIII International Colloquium on Group Theoretical Methods in Physics (Moscow, Rusia, 04.06-09.06, 1990)
- "Magnetization of a charged particle interacting with reservoir", II International Wigner Symposium (Goslar, Alemania, 16.07-20.07, 1991)
- "An exactly solvable model of an oscillator with nonlinear coupling and zeros of Bessel functions", II International Workshop on on Squeezed States and Uncertainty Relations (Moscow, Russia, 25.05-29.05, 1992)

- "Quantum processes in resonator with moving walls", II International Workshop on Squeezed States and Uncertainty Relations (Moscow, Rusia, 25.05-29.05, 1992)
- "Excitation spectrum of a detector rotating in a medium", International Workshop on the Zero point Electromagnetic field (Cuernavaca, Mexico, 29.03-02.04, 1993)
- "JCM without RWA", IV Encuentro Latinoamericano sobre Optica y Laseres (Oaxtepec, Mexico, 21.06-2.07, 1993)
- "General properties of quantum optical system in the quasiclassical limit", Third International Workshop on Squeezed States and Uncertainty Relations (Maryland, USA 10.08-13.08 1993)
- "On behavior of an arbitrary atomic system in a strong quantum field", Optical Society of America Annual Meeting (Toronto, Canada, 03.10-08.10, 1993)
- "Phase properties of the field in the Dicke model", XXXVI Congreso Nacional de Fisica, (Acapulco, Mexico 18.10-22.10, 1993)
- "Slightly anharmonic systems in quantum optics", Harmonic Oscillators, (Cocoyoc, Mexico, 23.03-25.03, 1994)
- "Quantizing operator and transition from semiclassical to quantum optics", IV Wigner Symposium (Guadalajara, Mexico, 07.08-11.08, 1995)
- "Evolution operator for quantum optical systems in a strong field limit", VII Rochester Conference on Coherence and Quantum Optics (Rochester, USA, 07.06--10.06 1995)
- "Resonance excitation of the vacuum state of field between oscillating plates", VII Rochester Conference on Coherence and Quantum Optics (Rochester, USA, 07.06--10.06 1995)
- "Collective effects in quantum optics", XXXI Latin American School of Physics (Mexico, D.F., 27.07-14.08, 1998)
- Semiclassical approach to quantum optical models, evolution operator, squeezing and dissipation", International Workshop on Symmetries in Quantum Mechanics and Quantum Optics (Burgos, Spain, 21.09-24.09, 1998)
- "Decoherence in driven and dissipative optical systems", Optical Systems in Phase Space (Cuernavaca, Mexico, 19.07-23.07, 1999)
- "Lie-type transformations and effective Hamiltonians in quantum optics", XXIII International Colloquium on Group Theoretical Methods in Physics (Dubna, Rusia, 31.07-05.08, 2000)
- "Wigner function dynamics on the sphere", VIII Rochester Conference on Coherence and Quantum Optics (Rochester, USA, 07.06--10.06, 2001)
- "SU(2) Wigner function and quasiclassical limit in quantum mechanical models", (Krakow, Polonia, 18.07-21.07, 2001)
- "Moyal-like form of the star-product for generalized SU(2) Stratonovich-Weyl symbols", XXIV International Colloquium on Group Theoretical Methods in Physics (Paris, France, 15.07-20.07.2002)
- "Resonance expansion and rotating wave approximation in quantum optics", VI International Workshop on Squeezed States and Uncertainty Relations (Puebla, Mexico, 05.06-09.06.2003) (invited).
- "Star product and differential calculus for the Weyl symbols on the sphere", XXV International Colloquium on Group Theoretical Methods in Physics", Cocoyoc, (02.08.2004-06.08.2004).
- "Classical dynamics of quantum fluctuations", Quantum Optics II, Cozumel, (06.12.04-09.12.04).
- "Discrete Wigner function dynamics", International Workshop on Squeezed States and Uncertainty Relations 05 (Besancon, France, 02.05-06.05.2005) (invited).
- Quantum evolution of the discrete wigner function, International Workshop on Low Dimensional Systems in Quantum Optics, Cuernavaca, Mexico (2005) (invited)
- Effective resonance transitions in quantum systems, XII International Conference on Symmetry Methods in Physics, Erevan, Armenia (2006) (invited)
- Hamiltonianos efectivos y transiciones resonantes , XIV Reunión Anual de la División de Gravitación y Física Matemática (2006) (invited)

- " Mutually Unbiased Basis and discrete phase-space structure", Quantum Optics III, Pucon Chile (27.11-30.11, 2006).
- "Discrete phase-space structure and MUB tomography", Central European Workshop on Quantum Optics (1.06-5.07, 2007), Palermo, Italy
- "Discrete phase-space structure and mutually unbiased bases", International Workshop on the Arithmetic of Finite Fields, WAIFI 2007, Madrid, Spain. June 21-22, 2007
- "Mutually Unbiased Bases and Geometry of Discrete quantum systems", Latin-American School of Physics, ELAF XXXVIII Quantum Information and Cold Quantum Matter, (27.08 – 7.09, 2007, México, D. F.) (invited)

Invited short courses

- "Actualization in quantum mechanics" (30 hr), (Dept.of Physics, University of Guadalajara, 17.02-28.02, 1997)
- "Approximated methods in quantum optics" (3 hr), First School in Quantum Optics, (Dept.of Physics, University of Concepcion, Chile, 17.07-19.07, 1997)
- " Lie algebras and its applications in quantum optics" (6 hr), (Dept.of Physics, University of Concepcion, Chile, 23.11-27.11, 1998)
- "Coherent structures in quantum optics" (3 hr), Workshop on Atoms and Cold Ions (Instituto Nacional de Astrofisica Optica y Electronica,Mexico, 26.11-29.11, 2001)
- "Strong dissipation in optical cavities" (3 hr), Second Workshop on Modern Optics (Instituto Nacional de Astrofisica Optica y Electronica, Mexico, 02.09-13.09, 2002)
- "Theory of quasidistribution functions and its application in quantum optics" (4 hr), Third Workshop on Modern Optics (Instituto Nacional de Astrofisica Optica y Electronica, Mexico, 01.09-05.09, 2003)
- "Effective dynamics in quantum optics" (2 hr), Second Workshop on Quantum Optics and Quantum Information (University of Concepcion, Chile, 06.01.2004-09.01.2004)
- "Dinámica semiclásica de sistemas cuánticos", Taller de Óptica Moderna (Instituto Nacional de Astrofísica Óptica y Electrónica, México, 06.09-10.09, 2004).
- Discrete systems: Wigner function and entanglement, III Escuela de primavera de optica e Informacion cuántica, Chile (6 hr), 2005

Publication list

Books

1. S. M. Chumakov, **A. B. Klimov**: Algebraic methods in Quantum Optics (in Spanish)}, Ed. Univ. of Guadalajara, ISBN 968-895-876-X, 274 p. (1999)
2. **A. B. Klimov**, S. M. Chumakov: Topics in quantum optics, Ed. Univ. of Guadalajara, Guadalajara, ISBN 968-7846-94-1, 246p. (2005)
3. J.L. Romero, S. M. Chumakov, **A. B. Klimov**: *Elements of Classical mechanics*", Ed. Univ. De Guadalajara, Guadalajara, ISBN 970-27-1145-2, 137p. (2007)

Chapters in books

1. S. M. Chumakov, **A. B. Klimov**, M. Kozierowski: "From the Jaynes-Cummings model to collective interactions" in Theory of Nonclassical States of Light, Ed. By V. V. Dodonov and V. I. Man'ko (Tylor & Francis, ISBN 0415284139, London, N.Y.) p.313-367 (2002)
2. Bjork G, **Klimov AB**, LL Sanchez-Soto, "Discrete Wigner Function", Progress in Optics, V.51 (2008)

Articles in refereed journals

1. **A.B.Klimov**: "Fluctuation of heating of thermal bath by the quantum oscillator", Sov.Phys.-Lebedev Inst.Rep. N 9, (1986), p.20-23.
2. **A.B.Klimov**, V.Sazonov: "Influence of mixing of states in atoms and molecule to their diffusion in a buffer gas", J.Tech. Phys. 57, (1987), p. 1261 –1267
3. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: "Photon number oscillations in a correlated light" , Journal of Soviet Laser Research (Plenum Publishing, London, N.Y.) 10, (1989), p.35 – 48
4. V.A.Andreev, **A.B.Klimov**, P.B.Lerner: "Geometrical phase for Jaynes-Cummings model and interference of atomic states" , JETP Letters 50, (1989), p.70 – 74
5. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Photon number oscillations in correlated light", Phys. Lett. 134 A, (1989), p.211 - 216.
6. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Nonstationary Casimir effect and oscillator energy level shift ", Phys. Lett. 142 A, (1989), p.511 - 513.
7. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Generation of squeezed states in a resonator with moving wall ", Phys. Lett. 149 A, (1990), p.225 - 228.
8. V.A.Andreev, **A.B.Klimov**, P.B.Lerner: " Berry phase in the atomic interferometer", Europhys. Lett. 12, (1990), p.101 - 106.
9. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Generation of squeezed light in a resonator with moving walls ", Lebedev Inst. Rep., N.10, (1990), p.15 - 19.
10. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Exact propagators for Lagrangians with higher derivatives in quantum mechanics" , Physica 170 A, (1991), p.595 - 611.
11. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Quantization and generation of squeezed states in a cavity with variable parameters ", Journal of Soviet Laser Research (Plenum Publishing, London, N.Y.), 12, (1991), p.439 – 446
12. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Quasiclassical propagator of quantum particle in the half - space confined with an ideal wall ", Nuovo Cimento B 106, (1991), p.1417- 1426.
13. V.V.Dodonov, **A.B.Klimov**: " Long - time asymptotic of quantized electromagnetic field in a resonator with oscillating boundary ", Phys. Lett.A 167, (1992), p.309 - 313.
14. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Quantum multidimensional systems with quadratic hamiltonians. Evolution of distinguished subsystems ", Proceed. of Lebedev Phys. Inst., 208, (1992), 105 - 179.
15. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: " Physical effects in correlated quantum states ", Proceed. of Lebedev Phys. Inst. (Nova Science Pub.) 205, (1993), p.56 -105.
16. V.V.Dodonov, **A.B.Klimov**, D.E.Nikonov: " Quantum phenomena in nonstationary media " , Phys. Rev. 47 A (1993), p.4422 - 4429.
17. V.V.Dodonov, **A.B.Klimov**, D.E.Nikonov: " Quantum phenomena in resonator with moving walls" , J.Math.Phys. 34 (1993), p.2742 - 2756.
18. V.V.Dodonov, **A.B.Klimov**, D.E.Nikonov: " Quantum particle in a box with moving walls ", J.Math.Phys. 34 (1993), p.3391 - 3404.

19. **A.B.Klimov**: " Excitation of a particle with internal structure moving near ideal wall ", Rev.Mex.Phys. 39, suppl.2, (1993), p.148 - 152.
20. S.M.Chumakov, **A.B.Klimov**, J.J.Sanchez-Mondragon: " General properties of quantum optical systems in a strong field limit ", Phys.Rev.A , 49 (1994) p.4972-4978.
21. V.P.Karassiov, **A.B.Klimov**: " An algebraic approach to solving evolution problems in some quantum models" , Phys.Lett.A , 189 (1994), p.43 - 51.
22. S.M.Chumakov, **A.B.Klimov**, J.J.Sanchez-Mondragon: " Collective atomic dynamics in a strong quantum field " Optics Comm., 118 (1995), p.529 - 536.
23. **A.B.Klimov**, S.M.Chumakov: "Semiclassical quantization of the evolution operator for a class of optical systems" Phys.Lett.A 202 (1995), p.145 - 154.
24. S.M.Chumakov, **A.B.Klimov**, C.Saavedra: " Competing interactions and quantum nonspreading wave packets " Phys.Rev.A, 52 (1995), p.3153 - 3156.
25. **A.B.Klimov**, S.M.Chumakov, J.Retamal, C.Saavedra: "An algebraic approach to the Jaynes - Cummings model with dissipation" Phys.Lett.A, 211 (1996), p.143 - 147.
26. V.V.Dodonov, **A.B.Klimov**: "Generation and detection of photons in a cavity with resonantly oscillating boundary", Phys.Rev.A, 53 (1996), p.2664 - 2682.
27. V.V.Dodonov, **A.B.Klimov**, V.I.Man'ko: "Low energy wave packet tunneling from a parabolic potential well through a high potential barrier ", Phys.Lett.A, 220 (1996), p.41 - 48.
28. **A.B.Klimov**, V.Altuzar: "Spectrum of photons generated in a one - dimensional cavity with oscillating boundary", Phys.Lett.A, 226 (1997), p.41 - 45.
29. J.C.Retamal, C.Saavedra, **A.B.Klimov**, S.M.Chumakov:" Squeezing of light by a collection of atoms " , Phys.Rev.A, 55 (1997), p.2413 - 2425.
30. **A.B.Klimov**, S.M.Chumakov: "Gaussians on the circle and phase distribution in quantum physics", Phys.Lett. A, 235, p.7-14 (1997).
31. S.M.Chumakov, G.Hellwig, **A.B.Klimov**: "Entropy of finite-level system", Int. J.Theor. Phys., 37, p.471-481 (1998).
32. A.Delgado, **A.B.Klimov**, J.Retamal, C.Saavedra: "Macroscopic field superpositions from collective interactions", Phys.Rev.A, 58, p.655-662 (1998).
33. **A.B.Klimov**, C.Saavedra: "The Dicke model dynamics in a high detuning limit", Phys.Lett. A, 247, p.14-20 (1998).
34. C.Saavedra, **A.B.Klimov**, S.M.Chumakov, J.C.Retamal: "Dissipation in collective interactions", Phys.Rev.A, 58, p.4078-4086 (1998).
35. **A.B.Klimov**, S.M.Chumakov, C.Saavedra: "Sharpening of field phase distribution from interaction with an atomic system", Phys.Lett.A, 251, p.1-5 (1999).
36. S.M.Chumakov, **A.B. Klimov**, C. Saavedra: "Coherent structures in quantum optical models with dissipation", Rep. Math. Phys., 43, p. 73-81 (1999).
37. S.Bruce, L.Roa, C. Saavedra, **A.B. Klimov**: "Unbroken supersymmetry in the Aharonov-Casher effect", Phys.Rev.A, 60, p. R1-R4 (1999).
38. **A.B.Klimov**, J.Negro, R.Farias, S.M.Chumakov: "Nonlinear dynamics of the two-photon Dicke models", J. Opt. B: Quant. Semiclass. Optics, 1, p. 562-570 (1999).
39. **A.B.Klimov**, S.M.Chumakov: "Long-time behavior of atomic inversion for the Jaynes-Cummings model in a strong thermal field", Phys. Lett. A, 264, p.100-102 (1999).
40. S.M.Chumakov, G.Hellwig, **A.B.Klimov**: "Developing entropy of open finite-level system", Int. J.Theor. Phys., 38, p.3221-3229 (1999)
41. S.M.Chumakov, **A.Klimov**, C. Saavedra: "Dispersive atomic evolution in a dissipative driven cavity ", Phys.Rev.A, 61, p. 033814-1-7 (2000).
42. S.M.Chumakov, **A.B. Klimov**, K. B. Wolf: "Connection between two Wigner functions for spin systems " , Phys.Rev.A, 61, p. 034101-1-3(2000).

43. J. Delgado, A. Luis, L.L. Sanchez-Soto, **A. B. Klimov**: "Quantum dynamics of the relative phase in second-harmonic generation", *J. Opt. B: Quant. Semiclass. Optics*, 2, p.33-40 (2000).
44. **A.B. Klimov**, V. I. Man'ko: "Symplectic tomography of the Jaynes-Cummings model", *Journ. Russian Laser Research*, 21, p.205-213 (2000).
45. **A.B. Klimov**, L.L. Sanchez-Soto: "Method of small rotations and effective Hamiltonians in nonlinear quantum optics", *Phys.Rev.A*, 61, p.063802-1-11 (2000).
46. **A.B. Klimov**, S.M.Chumakov: "On the quasiprobability distribution for simplest dynamical groups", *J.Opt.Soc.Am. A*, 17, p.2315-2318 (2000)
47. A. B. Klimov, L.L. Sanchez-Soto, J. Delgado: "Mimicking a Kerr-like medium in the dispersive regime of second-harmonic generation " *Opt. Comm.* 191, p.419-426 (2001)
49. **A.B. Klimov**, J.L. Romero, C. Saavedra: "General properties of quantum systems interacting with a field mode in a low-Q cavity ", *Phys.Rev.A*, 64, p.063802-1-7 (2001).
50. N. Debergh, **A.B. Klimov**: "Quasi-exactly solvable approach to the Jaynes-Cummings model without rotation wave approximation ", *Int.J. Mod. Phys.A*, 16, p.4057-4068 (2001).
51. **A.B. Klimov**: "Exact evolution equations for SU(2) quasi-distribution functions", *J. Math.Phys.*, 43, 2202-2213 (2002).
52. **A. B. Klimov**, O. V. Man'ko, V. I. Man'ko, Yu. F. Smirnov and V.N. Tolstoy "Tomographic representation of spin and quark states", *J.Phys. A*, 35, p.6101-6123 (2002)
53. **A. B. Klimov**, P. Espinoza, "Moyal-like form of the star-product for generalized SU(2) Stratonovich-Weyl symbols", *J.Phys.A*, 35, p.8435-8447 (2002).
54. **A. B. Klimov**, S.M.Chumakov: "On the SU(2) Wigner function dynamics", *Rev.Mex.Fis.*, 48, p. 317-324 (2002).
55. L.L. Sanchez-Soto, J. Delgado, **A. B. Klimov**, G. Björk : "Description of entanglement in terms of quantum phase " *Phys.Rev.A* 66, p.042112-1-8 (2002).
56. **A. B. Klimov**, J.A. Navarro, L.L. Sanchez-Soto, E.Yustas, "Effective Hamiltonians in quantum optics: a systematic approach", *J.Mod.Opt.* 49, 2211-2226 (2002).
57. **A. B. Klimov**, J.L. Romero, L.L. Sanchez-Soto, J. Delgado, "Master equations for effective Hamiltonians", *J.Opt. B.: Qunt.Sem.Opt.* 5, p.34-39 (2003).
58. **A. B. Klimov**, L.L. Sanchez-Soto, J. Delgado, E.Yustas, "Phase states for a three-level atom interacting with quantum fields", *Phys.Rev.A* 67, 013803-1-8 (2003).
59. **A. B. Klimov**, J.L. Romero, "An algebraic approach to solving Lindblad-type master equations", *J.Opt. B.: Quant.Sem.Opt.*, 5, p.316-321 (2003).
60. I. Sainz, **A. B. Klimov**, S.M. Chumakov, "Atom-field interaction modified by atomic environment", *J.Opt. B.: Quant.Sem.Opt.*, 5, p.190-199 (2003).
61. **A. B. Klimov**, R. Guzman, J. C. Retamal, C. Saavedra, "Qutrit quantum computer with trapped ions", *Phys. Rev. A* 67, 062313-1-7 (2003).
62. **A. B. Klimov**, I. Sainz, S.M. Chumakov, "Resonance expansion versus the rotating wave approximation", *Phys. Rev. A* 68, 063811-1-8 (2003).
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