

Curriculum Vitae

Personal data:

Name: Hayk A. Sarkisyan
Born: 2 June, 1972, Yerevan, ARMENIA
Nationality: Republic of Armenia
Marital Status: Married



Professional addresses:

Department of General and Theoretical Physics,
123 Hovsep Emin Str., Yerevan, 0051, Armenia

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1 Alex Manoogian Str., Yerevan, 0025, Armenia

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Education and Degrees:

2005

Doctor of Science in Physics (Habilitation)

Thesis: "Some questions of the theory of electronic and optical properties of low-dimensional semiconductor quantum structures" ("Некоторые вопросы теории электронных и оптических свойств квантовых низкоразмерных полупроводниковых структур")

1997

PhD in Physics

Thesis: "Theoretical study of the excitonic states and optical properties of semiconductor nanostructures" ("Теоретическое исследование экситонных состояний и оптических свойств полупроводниковых наноструктур")

PhD Student 1994-1997

Department of Solid State Physics, Faculty of Physics, Yerevan State University

1994

Diploma with Honors

Thesis: "Two-dimensional relativistic hydrogen atom"

1989-1994 Student of Faculty of Physics, Yerevan State University

Employment

- 2012-present **Head of Department of General Physics and Quantum Nanostructures**
Russian Armenian University
- 2008-2012 **Dean Faculty of Physics and Technology**
Russian Armenian University
- 2006-present **Professor**
Department of General Physics and Quantum Nanostructures, Russian Armenian University
- 2001-2006 **Associated Professor**
Department of Physics, State Engineering University of Armenia
- 2002-present **Senior Scientist**
Department of Solid State Physics, Yerevan State University
- 1997-2002 **Scientists**
Department of Solid State Physics, Yerevan State University, Armenia

Awards:

- 2011 State Awards of the Republic of Armenia in the Area of Precise and Natural Sciences
- 2007 Republic of Armenia Presidential Award in Physics

Scientific Interests:

- Electronic properties of quantum nanostructures (quantum wells, wires and dots).
- Optical properties (interband and intraband transitions, impurity and excitonic light absorption, direct and non direct interband light absorption) of quantum nanostructures (quantum wells, wires and dots).
- Few-body problems in quantum dots.
- Electrodynamical and spin characteristics of quantum dots.
- Stationary adiabatic approximation for the description of quantum nanostructures.

Reviewer:

1. Physica **E**
2. Physica **B**
3. Superlattices and Microstructures
4. Optics Communications
5. Solid State Communications
6. Journal of Mathematical Physics
7. Journal of Luminescence
8. European Physical Journal **B**
9. Modern Physics Letters **B**
10. International Journal of Theoretical Physics
11. Applied Surface Science
12. Condensed Matter Physics
13. Central European Journal of Physics
14. Optical and Quantum Electronics
15. Journal of Contemporary Physics
16. Journal of Modern Physics
17. Journal of Physics: Conference Series
18. International Journal of Modern Physics : Conference Series

Editor:

- **Journal of Physics: Conference Series**, vol. 350. Proceedings of International Symposium on Optics and its Applications (OPTICS-2011), Yerevan-Ashtarak, Armenia, September 5-9, 2011 (*The Editors: A.B. Bhattacharjee, M.L. Calvo, E.M. Kazaryan, A.V. Papoyan, H.A. Sarkisyan*).
- “Actual problems of physics of low-dimensional systems”, Proceedings of the Conference Dedicated to the 70th Birthday of Academician E.M. Kazaryan (*Executive Editor H.A. Sarkisyan*).

Conferences organizing committee membership

- 2014 Upcoming 2nd **International Symposium on Optics & its applications (OPTICS-2014)**, 18 - 20 September 2014, Yerevan & Ashtarak, Armenia
- 2014 Upcoming 2nd **International Advanced School on Frontiers in Optics & Photonics (FOP-2014)**, 14 - 17 September 2014, Yerevan & Ashtarak, Armenia
- 2012 **International Advanced School on Frontiers in Optics & Photonics (FOP-2012)**, 2 - 7 July 2012, Yerevan & Ashtarak, Armenia
- 2011 **International Symposium on Optics & its applications (OPTICS-2011)**: 5 - 9 September 2011, Yerevan & Ashtarak, Armenia
- 2011 **Photonics Micro- and Nanostructured Materials (PMNM-2011)**: 28-31 June, 2011, Yerevan, Armenia
- 2000, 2002, 2004 **National Conference for Young Physicists “Physics-2000, 2002, 2004”**, 17-20 September, 2000, Yerevan, Armenia; 25-28 September, 2002, Yerevan, Armenia; 22-24 April, 2004, Stepanakert, Artsakh

Supervisor:

5 PhD – Theses

1. Lyudvig Petrosyan
2. Areg Meliksetyan
3. Marwan Zuhair (Iraq)
4. Ara Atayan
5. Narek Aghekyan

More than 10 Master Theses

LIST OF PRINCIPLE PUBLICATIONS (Hayk Sarkisyan)

1. Papers in journals

- 1 A.P. Djotyan, E.M. Kazaryan and H.A.Sarkisyan, "Relativistic two-dimensional hydrogen atom", *Journal of Contemporary Physics*, vol. 29, pp.27-31 (1994).
- 2 A.A. Kirakosyan, M.K.Koumashyan, K.A. Mkhoyan and H.A. Sarkisyan, "Light absorption in a semiconductor, containing dislocations, in indirect interband transitions", *Journal of Contemporary Physics*, vol. 30, pp.14-20 (1995).
- 3 K.A. Mkhoyan and H.A. Sarkisyan, "Function of dielectric susceptibility of size-quantized semiconductor film", *Sci. Lett. of YSU*, vol. 2, pp.37-41 (1996).
- 4 E.M. Kazaryan, K.A. Mkhoyan and H.A. Sarkisyan, "Indirect transitions caused by electron dislocation interaction in size-quantized semiconductor film", *Thin Solid Films*, vol. 302, pp. 54-57 (1997).
- 5 E.M. Kazaryan, K.A. Mkhoyan and H.A. Sarkisyan, "Indirect transitions in thin films due to Coulomb interactions between electrons", *Thin Solid Films*, vol. 338, pp. 185-187 (1999).
- 6 A.A. Avetisyan, A.P. Djotyan, E.M. Kazaryan and H.A. Sarkisyan, "Relativistic hydrogen atom in a high magnetic field", *Journal of Contemporary Physics*, vol. 34, pp.24-28 (1999).
- 7 A.A. Avetisyan, A.P. Djotyan, E.M. Kazaryan and H.A. Sarkisyan, "Impurity states in narrow band semiconductor in a high magnetic field", *Physica Status Solidi B*, vol. 214, pp. 91-95 (1999).
- 8 H.A. Sarkisyan, "Dielectric susceptibility of electron gas with nonparabolic dispersion law", *Reports of National Academy of Sciences Republic of Armenia*, vol.100, pp.143-146 (2000).
- 9 E.M. Kazaryan, L.S. Petrosyan and H.A. Sarkisyan, "Energy levels of an electron with Kane's law of dispersion in a spherical microcrystal", *Physica E*, vol.8, pp. 19-23 (2000).
- 10 A.A. Avetisyan, E.M. Kazaryan and H.A. Sarkisyan, "The hydrogen-like impurity states in A^3B^5 semiconductor microcrystals", *Journal of Contemporary Physics*, vol.35, pp. 21-24 (2000).
- 11 E.M. Kazaryan, L.S. Petrosyan and H.A. Sarkisyan, "Electronic states in narrow band gap semiconductor microcrystal with parabolic confinement in magnetic field", *Physica E*, vol.11, pp. 362-367 (2001).
- 12 E.M. Kazaryan, L.S. Petrosyan and H.A. Sarkisyan, "Impurity states in a parabolic

quantum dot under action of a high magnetic field", *International Journal of Modern Physics B*, vol.15, pp.4103-4110 (2001).

13 H.A. Sarkisyan, "To the problem of violation of Kohn's theorem in quantum dots", *Journal of Contemporary Physics*, vol.37, pp.233-236 (2002).

14 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan "Influence of semiconductor-dielectric transition border on the electronic states in spherical quantum dots", *Journal of Contemporary Physics*, vol.37, pp. 120-128, (2002).

15 H.A. Sarkisyan, "Electronic states in cylindrical quantum dot in the presence of parallel electrical and magnetic fields", *Modern Physics Letters B*, vol.16, pp.835-841 (2002).

16 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "Impurity states in a narrow band gap semiconductor quantum dot with parabolic confinement potential", *Physica E*, vol.16, pp. 174-178 (2003).

17 L.G. Mardoyan, L.S. Petrosyan, H.A. Sarkisyan, "The charge-dyon bound system in the spherical quantum well", *Physical Review A*, vol.68, id 014103 (2003).

18 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "Impurity states in truncated parabolic quantum dot", *Reports of National Academy of Sciences Republic of Armenia*, vol.104, pp.302-307 (2003).

19 H.A. Sarkisyan, "Direct optical absorption in cylindrical quantum dot", *Modern Physics Letters B*, vol.18, pp. 443-452 (2004).

20 M.S. Atoyan, E.M. Kazaryan, H.A. Sarkisyan, "Direct interband light absorption in a cylindrical quantum dot in quantizing magnetic field", *Physica E*, vol.22, pp. 860-866 (2004).

21 M.S. Atoyan, H.A. Sarkisyan, "Absorption coefficient of size-quantized $A^3 B^5$ semiconductor film with dislocations", *Physica B*, vol. 352, pp. 241-246 (2004).

22 M.S. Atoyan, E.M. Kazaryan, H.A. Sarkisyan, "Interband light absorption in a cylindrical quantum dots in the presence of electrical field", *Reports of National Academy of Sciences Republic of Armenia*, vol.104, pp.314-320 (2004).

23 M.S. Atoyan, E.M. Kazaryan, H.A. Sarkisyan, "Optical transitions in parabolic quantum dot", *Physics of Atomic Nuclei*, vol.68, pp. 1726-1729 (2005).

24 E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Impurity optical absorption in parabolic quantum well", *Physica E*, vol.28, pp. 423-430 (2005).

25 M.S. Atoyan, E.M. Kazaryan, H.A. Sarkisyan, "Interband light absorption in parabolic quantum dot in the presence of electrical and magnetic fields", *Physica E*, vol.31, pp. 83-85 (2006).

- 26 E.M. Kazaryan, A.V. Meliksetyan, L.S. Petrosyan, H.A. Sarkisyan, "Impurity states of narrow-gap semiconductor parabolic quantum dot in the presence of extremely strong magnetic field", *Physica E*, vol.31, pp. 228-231 (2006).
- 27 K.G. Dvovyan, H.A. Sarkisyan, A.A. Chanchapanyan, "Electronic states in quantum wire with the modified parabolic confinement potential", *Russian-Armenian University Science Letters*, N1, pp. 54-60 (2006).
- 28 H.A.Sarkisyan, "On the criteria of the applicability of the single-particle transitions in multi-particle system", *Physics of Part. and Nucl. Letters*, vol. 4, pp. 51-54 (2007).
- 29 V.A. Harutyunyan, E. M. Kazaryan, A. A. Kostanyan, H. A. Sarkisyan, "Interband transitions in cylindrical layer quantum dot: influence of magnetic and electric fields", *Physica E*, vol. 36, pp. 114-118 (2007).
- 30 E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Optical absorption in GaAs quantum wells caused by donor-acceptor pair transitions", *Journal of Physics: Condensed Matter*, vol. 19, id 046212 (9pp) (2007).
- 31 E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Interband transitions in a spherical quantum layer in the presence of an electric field: spherical rotator model", *Journal of Contemporary Physics*, vol. 42, pp. 145-150 (2007).
- 32 L.G. Mardoyan, A.P. Nersessian, H.A. Sarkisyan, V.R. Yeghikyan, "Dipole transitions and Stark effect in the charge-dyon system", *Journal of Physics A: Mathematical and Theoretical*, vol. 40, pp. 5973-5980 (2007).
- 33 E.M. Kazaryan, A.V. Meliksetyan, H.A. Sarkisyan, "Interband transitions in a InSb narrow-gap cylindrical quantum dot", *Technical Physics Letters*, vol. 33, pp. 49-56 (2007).
- 34 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "Hidden symmetry and excitonic transitions in the quantum well", *Physica E*, vol. 40, pp. 536-541 (2008).
- 35 M. Zoheir, A.Kh. Manaselyan, H.A. Sarkisyan, "Electronic states and Stark shift in narrow band InSb quantum spherical layer", *Physica E*, vol. 40, pp. 2945-2949 (2008).
- 36 A.K. Atayan, E.M. Kazaryan, A.V. Meliksetyan, H.A. Sarkisyan, "Magneto-absorption in cylindrical quantum dots", *European Physical Journal B*, vol. 63, pp. 485-492 (2008).
- 37 M. Zuhair, A.Kh. Manaselyan, H.A. Sarkisyan, "Magneto- and electroabsorption in narrow-gap InSb cylindrical layer quantum dot", *Physica E*, vol. 41, pp. 1583-1590 (2009).
- 38 A.A. Gusev, O. Chuluunbaatar, S.I. Vinitzky, V.L. Derbov, E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Adiabatic approach to the problem of a quantum well with a hydrogen-like impurity", *Physics of Atomic Nuclei*, vol.73, pp. 331-338 (2010).

- 39 E.M. Kazaryan, A.V. Meliksetyan, H.A. Sarkisyan, "Interband absorption in a InSb narrow-band cylindrical quantum dot in presence of the magnetic field", *Journal of Computational and Theoretical Nanoscience*, vol. 7, N2, pp. 486-491 (2010).
- 40 A.K. Atayan, E.M. Kazaryan, A.V. Meliksetyan, H.A. Sarkisyan, "Interband magnetoabsorption in cylindrical quantum layer with Smorodinsky-Winternitz confinement potential", *Journal of Computational and Theoretical Nanoscience*, vol. 7, N6, pp. 1165-1171 (2010).
- 41 A.K. Atayan, E.M. Kazaryan, A.V. Meliksetyan, H.A. Sarkisyan, "Magnetoexcitonic states in a quantum ring with the Winternitz-Smorodinsky confinement potential", *Journal of Contemporary Physics*, vol. 45, N3, pp. 126-131 (2010).
- 42 M.S. Atoyán, E.M. Kazaryan, B.Zh. Poghosyan, H.A. Sarkisyan, "Interband absorption and excitonic states in narrow band InSb spherical quantum dots", *Physica E*, vol. 43, pp. 1592-1596 (2011).
- 43 N.G. Aghekyan, E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Two electronic states and state exchange time control in spherical nanolayer", *Superlattices and Microstructures*, vol. 50, pp. 199-206 (2011).
- 44 S. Liang, W.-F. Xie, H.A. Sarkisyan, A.V. Meliksetyan, H. Shen, "Nonlinear optical properties in a nanoring: quantum size and magnetic field effect", *Journal of Physics: Condensed Matter*, vol. 23, pp. 415302 (6 pages) (2011).
- 45 V.A. Harutyunyan, E.M. Kazaryan, H.A. Sarkisyan, "Optical absorption in a narrow-band InSb cylindrical layered nanowire in the presence of strong electrostatic field", *Journal of Contemporary Physics*, vol. 46, pp. 285-292 (2011).
- 46 S. Liang, W.-F. Xie, H.A. Sarkisyan, A.V. Meliksetyan, H. Shen, "Electronic and optical properties of a nanoring in the presence of external magnetic field", *Superlattices and Microstructures*, vol. 51, pp. 868-876 (2012).
- 47 A.A. Kirakosyan, E.M. Kazaryan, V.N. Mughnetsyan, H.A. Sarkisyan, "Tunability of absorption threshold frequencies and Stark shift in the InSb narrow gap spherical quantum layer", *Semiconductor Science and Technology*, vol. 27, pp. 085003 (6 pages) (2012).
- 48 N.G. Aghekyan, E.M. Kazaryan, H.A. Sarkisyan, "A single electron current in a cylindrical nanolayer", *Reports of National Academy of Sciences Republic of Armenia*, vol.112, pp.73-78 (2012).
- 49 N.G. Aghekyan, E.M. Kazaryan, H.A. Sarkisyan, "Two Electron States in a Thin Spherical Nanolayer: Reduction to the Model of Two Electrons on a Sphere", *Few-Body*

Systems, vol. 53, pp. 505-513 (2012).

50 A. A. Gusev, O. Chuluunbaatar, S. I. Vinitzky, K. G. Dvovyan, E. M. Kazaryan, H.A. Sarkisyan, V. L. Derbov, A.S.Klombotskaya, V. V. Serov, "Adiabatic Description of Nonspherical Quantum Dot Models", *Physics of Atomic Nuclei*, vol.75, pp. 1210-1226 (2012).

51 D.B. Hayrapetyan, E.M. Kazaryan, H.A. Sarkisyan, "On the possibility of implementation of Kohn's theorem in the case of ellipsoidal quantum dots", *Journal of Contemporary Physics*, vol. 48, pp. 32-36 (2013).

52 E.M. Kazaryan, V.A. Shahnazaryan, H.A. Sarkisyan, "Quantum ring on sphere: electron state on spherical segment", *Physica E*, vol. 52, pp. 122-126 (2013).

53 V.A. Harutyunyan, V.A. Gasparyan, E.M. Kazaryan, H.A. Sarkisyan, "Electron and hole states in a narrow-band semiconductor InSb film in the presence of uniform electrostatic field", *Journal of Contemporary Physics*, vol. 48, pp. 162-172 (2013).

54 A.A. Gusev, L.L. Hai, S.I. Vinitzky, O. Chuluunbaatar, V.L. Derbov, A.S. Klombotskaya, K.G. Dvovyan, H.A. Sarkisyan, "Analytical and numerical calculations of spherical and optical characteristics of spheroidal quantum dots", *Physics of Atomic Nuclei*, vol.76, pp. 1033-1055 (2013).

2. Conference proceedings

1 A.P. Djotyan, E.M. Kazaryan and H.A.Sarkisyan, "The binding energy of excitons in thin semiconductor films", *Semiconductor Microelectronics, Proc. of the First National Conference*, pp.6-8, Dilijan, Armenia (1997).

2 H.A. Sarkisyan, "Electronic states in impermeable microcrystals with parabolic potential", *Semiconductor Microelectronics, Proc. of the Second National Conference*, pp.71-73, Dilijan, Armenia (1999).

3 M.S. Atoyanyan, H.A. Sarkisyan "Dislocation mechanism of light absorption in a narrow band semiconductor", *Semiconductor Microelectronics, Proc. of the Third National Conference*, pp. 82-85, Sevan, Armenia (2001).

4 E.M. Kazaryan, L.S. Petrosyan and H.A. Sarkisyan, "One-particle states in parabolic quantum dot with regard to boundary conditions", *Proc. of 23 International Colloquium on*

Group Theoretical Methods in Physics, Dubna, Eds A.N. Sissakian, G.S. Pogosyan, L.G. Mardoyan, vol.2, pp. 542-546, Dubna, Russia (2002).

5 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "Electronic states in parabolic quantum dot taking into account boundary conditions", *Physics of Particles and Nuclei*, vol.34, pp.S39-S42 (2003).

6 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "To the problem of energy spectrum and Stark splitting behavior in quantum wells", *Semiconductor Micro- and nanoelectronics, Proc. of the Fifth International Conference*, pp. 141-144, Agveran, Armenia (2005).

7 E.M. Kazaryan, L.S. Petrosyan, H.A. Sarkisyan, "Modeling of the electronic states in quantum ring with the Smorodinsky – Winternitz confining potential", *PEM – 2006*, vol. 2 pp. 9-11, Divnomorskoe, Russia (2006).

8 A.V. Meliksetyan, H.A. Sarkisyan, "Magnetoexciton in a quantum disc", *Semiconductor Micro- and Nanoelectronics, Proc. of the Sixth International Conference*, pp. 58-60, Tsakhcadzor, Armenia (2007).

9 M. Zuhair, A.Kh. Manaselyan, H.A. Sarkisyan, "Interband transitions in narrow gap InSb spherical layer quantum dot in the presence of electric field", *Journal of Physics: Conference Series*, vol. 129, id 012017 (4pp) (2008).

10 K.G. Dvovyan, E.M. Kazaryan, H.A. Sarkisyan, "One-, two-electronic and excitonic states in a quantum dots with nontrivial geometries: adiabatic description", *Modern Problem of Optics and Photonics – 2009, Proc. Of International Conf.*, World Scientific Publishing, pp.165-181 (2010).

11 A. A. Gusev, O. Chuluunbaatar, S. I. Vinitzky, E. M. Kazaryan, H. A. Sarkisyan, "The application of adiabatic method for the description of impurity states in quantum nanostructures", *Journal of Physics: Conference Series*, vol. 248, 012047 (8 pages) (2010).

12 N.G. Aghekyan, E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Two electronic states in a quantum ring: Mathieu equation approach", *Journal of Physics: Conference Series*, vol. 248, 012048 (8pages) (2010).

13 N.G. Aghekyan, E.M. Kazaryan, A.A. Kostanyan, H.A. Sarkisyan, "Two electronic states in spherical quantum nanolayer", *Proc. SPIE*, vol. 7998, 79981C (9 pages) (2010).

14 A.A. Kirakosyan, E.M. Kazaryan, V.N. Mughnetsyan, H.A. Sarkisyan, "Tunability of absorption threshold frequencies and Stark shift in spherical quantum layer", *Proc. SPIE*, vol. 8414, 84140B (8 pages) (2011).

15 N.G. Aghekyan, E.M. Kazaryan, H.A. Sarkisyan, "Dipole and quadrupole moments of

electron in spherical nanolayer", *Journal of Physics: Conference Series*, vol. 350, Issue 1, pp. 012014 (8 pages) (2012).

16 K.G. Dvoyan, V.G. Evoyan, E.M. Kazaryan, R.G. Nazmitdinov, H.A. Sarkisyan, "Magneto-absorption in ellipsoidal quantum dot ", *International Journal of Modern Physics: Conference Series*, vol. 15, pp. 40-47 (2012).

17 A.A. Gusev, O. Chuluunbaatar, L.L. Hai, S.I. Vinitzky, E.M. Kazaryan, H.A. Sarkisyan, V.L. Derbov, " Spectral and optical characteristics of spheroidal quantum dots ", *Journal of Physics: Conference Series*, vol. 393, Issue 1, pp. 012011 (8 pages) (2012).

3. Book chapter

1. E.M. Kazaryan, H.A. Sarkisyan, "Layered nanostructures", *Encyclopedia UNESCO Nanoscience and Nanotechnology*, Ed. V.N. Kharkin (Russian Edition) pp. 120-133 (2011)