

# Tigran Stepan Hakobyan

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## Institute of Physics

Chair of Theoretical Physics named after Academician Gurgen Sahakyan

Associate professor

## Education

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<b>Institution</b>	YSU
<b>Faculty</b>	Faculty of physics, theoretical physics chair
<b>Date</b>	1989 - 1992
<b>Degree name</b>	PhD student

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<b>Institution</b>	YSU
<b>Faculty</b>	Faculty of physics, Theoretical physics chair
<b>Date</b>	1982 - 1989
<b>Degree name</b>	Masters

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## Scientific Rank/degree

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<b>Institution</b>	YSU
<b>Date</b>	2013
<b>Degree name</b>	Doctor
<b>Specialty</b>	Physico-mathematical sciences
<b>Research Topic</b>	Exact methods in one-dimensional and quasi-one-dimensional systems

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<b>Institution</b>	Yerevan Physics Institute
<b>Date</b>	1996
<b>Degree name</b>	Candidate
<b>Specialty</b>	Physico-mathematical sciences
<b>Scientific Supervisor</b>	Ara Sedrakyan
<b>Research Topic</b>	R-matrices in quantum groups

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## Language skills

Հայերեն English Русский Français

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## Work experience

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<b>Institution</b>	A. Alikhanyan national science laboratory (Yerevan Physics Institute)
<b>Period of time</b>	2022 till now

**Rank/degree** leading researcher

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**Institution** YSU

**Period of time** 2021 till now

**Rank/degree** leading researcher

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**Institution** Theoretical physics chain, YSU

**Period of time** 2013 till now

**Rank/degree** Associated professor

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## Publications

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*Article*

### **Dunkl symplectic algebra in generalized Calogero models**

Tigran Hakobyan

Journal of Physics A: Mathematical and Theoretical 2025 065201

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*Article*

### **Two-dimensional topological paramagnets protected by Z3 symmetry: Properties of the boundary Hamiltonian**

Hrant Topchyan, Vasilii Iugov, Mkhitar Mirumyan, Tigran Hakobyan, Tigran A. Sedrakyan,

Ara G. Sedrakyan

SciPost Physics 2025 068

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*Article*

### **Simple Extension of Kitaev Chain for Z3 Parafermions [Простое обобщение цепочки Китаева для Z3 парафермионов]**

Hakobyan T.S., Varosyan R.H., Harutunyan G.H.

Известия НАН РА. Физика (Journal of Contemporary Physics (Armenian Academy of Sciences) 2024

28-35

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*Article*

### **Sectorial Ground-State Nondegeneracy in Majorana Chains with Interaction and Orthogonal Symmetry [Невырожденность секториальных основных состояний в майорановских цепочках с взаимодействием и ортогональной симметрией]**

T. S. Hakobyan

Известия НАН РА. Физика (Journal of Contemporary Physics (Armenian Academy of Sciences) 2024

437-444

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*Article*

### **Z<sub>3</sub> and $(\times Z_3)^3$ symmetry protected topological paramagnets.**

Hrant Topchyan, Vasilii Iugov, Mkhitar Mirumyan, Shahane Khachatryan, Tigran Hakobyan,

Tigran Sedrakyan

Journal of High Energy Physics 2023 35

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*Article*

### **Algebra of Dunkl Laplace-Runge-Lenz vector**

Misha Feigin, Tigran Hakobyan

Letters in Mathematical Physics 2022 59, 1-29

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*Article*

**Superintegrable systems related to truncated Calogero model**

T. Hakobyan, S. Vardanyan

Proceedings of Science 2021 006/10

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*Article*

**Lowest energy states of an  $O(N)$  fermionic chain**

Tigran Hakobyan

Physical Review B 2020 085128(1-18)

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*Article*

**Symmetry Algebra of Dynamical and Discrete Calogero Models**

Tigran Hakobyan, Seda Vardanyan

Physics of Particles and Nuclei Letters 2020 734-737

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*Article*

**Symmetries of the generalized Calogero model and the Polychronakos-Frahm chain**

Tigran Hakobyan

Physical Review D 2019 105011(1-7)

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*Article*

**Myers-Perry Conformal Mechanics**

H. Demirchian, T. Hakobyan, A. Nersessian, M.M. Shekh-Jabbari

Physics of Particles and Nuclei 2018 860-864

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*Article*

**Integrability of Calogero-Coulomb Problems**

Tigran Hakobyan, Armen Nersessian

Physics of Particles and Nuclei Letters 2017 331-335

<http://link.springer.com/journal/11497>

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*Article*

**Constants of Motion in Deformed Oscillator and Coulomb Systems**

Tigran Hakobyan, Armen Nersessian, Hovhannes Shmavonyan

Physics of Particles and Nuclei Letters 2017 400-402

<http://link.springer.com/journal/11497>

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*Article*

**Symmetries in superintegrable deformations of oscillator and Coulomb systems: Holomorphic factorization**

Tigran Hakobyan, Armen Nersessian

Physical Review D 2017 025014

<http://journals.aps.org/prd/>

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*Article*

**Two-center Coulomb Problem with Calogero Interaction**

Tigran Hakobyan, Armen Nersessian

Physics of Atomic Nuclei 2017 383-388  
<http://link.springer.com/journal/11450>

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*Article*

**Lobachevsky geometry in TTW and PW systems**  
Tigran Hakobyan, Armen Nersessian, Hovhannes Shmavonyan  
Physics of Atomic Nuclei 2017 591-597  
<http://link.springer.com/journal/11450>

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*Article*

**Near horizon extremal Myers-Perry black holes and integrability of associated conformal mechanics**  
Tigran Hakobyan, Armen Nersessian, M.M.Sheikh-Jabbari  
Physics Letters B 2017 586-591  
<http://www.journals.elsevier.com/physics-letters-b>

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*Article*

**CALOGERO MODEL AND ITS GENERALIZATION**  
T.Hakobyan, A.Nersessian  
Вестник Российско-Армянского Университета: Физико-математические и естественные науки 2017 91-95  
<http://science.rau.am/rus/50/701>

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*Article*

**Spherical Calogero model with oscillator/Coulomb potential: Classical case**  
Francisco Correa, Tigran Hakobyan, Olaf Lechtenfeld, Armen Nersessian  
Physical Review D 2016 125008,9  
<http://journals.aps.org/prd/>

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*Article*

**Spherical Calogero model with oscillator/Coulomb potential: Quantum case**  
Francisco Correa, Tigran Hakobyan, Olaf Lechtenfeld, Armen Nersessian  
Physical Review D 2016 125009  
<http://journals.aps.org/prd/>

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*Article*

**Integrability and separation of variables in Calogero-Coulomb-Stark and two-center Calogero-Coulomb systems**  
Tigran Hakobyan, Armen Nersessian  
Physical Review D 2016 045025,14  
<http://journals.aps.org/prd/>

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*Article*

**Coulomb systems with Calogero Interaction**  
Tigran Hakobyan, Armen Nersessian  
Proceedings of the YSU A. Physical and Mathematical Sciences 2016 15-19  
<http://www.yasu.am/science/en/journals>

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*Article*

**On Dunkl angular momenta algebra**

Misha Feigin, Tigran Hakobyan

Journal of High Energy Physics 2015 107,22

<http://www.springer.com/physics/particle+and+nuclear+physics/journal/13130>

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*Article*

**Lowest-energy states in parity-transformation eigenspaces of  $SO(N)$  spin chain**

Tigran Hakobyan

Nuclear Physics B 2015 248-258

<http://www.sciencedirect.com/science/journal/05503213>

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*Article*

**Runge-Lenz vector in Calogero-Coulomb problem**

Tigran Hakobyan, Armen Nersessian

Physical Review A 2015 22111

<http://journals.aps.org/pr/>

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*Article*

**Superintegrability of generalized Calogero models with oscillator or Coulomb potential**

Tigran Hakobyan, Olaf Lechtenfeld, Armen Nersessian

Physical Review D 2014 101701(R),6

<http://journals.aps.org/prd/>

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*Article*

**The structure of invariants in conformal mechanics**

Tigran Hakobyan, David Karakhanyan, Olaf Lechtenfeld

Nuclear Physics B 2014 399-420

<http://www.sciencedirect.com/science/journal/05503213>

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*Article*

**The spherical sector of the Calogero model as a reduced matrix model**

Tigran Hakobyan, Armen Nersessian, Francisco Correa, Olaf Lechtenfeld

Nuclear Physics B 2012 250-266

<http://www.journals.elsevier.com/nuclear-physics-b/>

---

*Article*

**Integrable generalizations of oscillator and Coulomb systems via action-angle variables**

Tigran Hakobyan, Armen Nersessian, Armen Saghatelian, Vahagn Yeghikyan, Olaf Lechtenfeld

Physics Letters A 2012 679-686

<http://www.journals.elsevier.com/physics-letters-a>

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*Article*

**Action-angle variables and novel superintegrable systems**

Armen Nersessian, Tigran Hakobyan, Armen Saghatelian, Vahagn Yeghikyan, Olaf Lechtenfeld

Physics of Particles and Nuclei 2012 577-582

<http://www.springer.com/physics/particle+and+nuclear+physics/journal/11496>

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*Manual*

**Չուզահեռ ծրագրավորում MPI փաթեթի միջոցով**

S.U. Հակոբյան

2012 42

---

*Article*

**Invariants of the spherical sector in conformal mechanics**

Tigran Hakobyan, Armen Nersessian, Armen Saghatelian, Olaf Lechtenfeld

Journal of Physics A-Mathematical and Theoretical 2011 055205, 14 pages

<http://iopscience.iop.org/journal/1751-8121>

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*Article*

**Invariants of the spherical sector in conformal mechanics**

Tigran Hakobyan, Armen Nersessian, Armen Saghatelian, Olaf Lechtenfeld

Journal of Physics A-Mathematical and Theoretical 2011 055205, 14

<http://iopscience.iop.org/journal/1751-8121>

---

*Article*

**Ordering of Energy Levels for Extended SU(N) Hubbard Chain**

Tigran Hakobyan

Symmetry Integrability and Geometry-Methods and Applications 2010 024,13

<http://www.emis.de/journals/SIGMA/>

---

*Article*

**Hidden symmetries of integrable conformal mechanical systems**

Tigran Hakobyan, Armen Nersessian, Sergey Krivonos, Olaf Lechtenfeld

Physics Letters A 2010 801-806

<http://www.journals.elsevier.com/physics-letters-a>

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*Article*

**Energy-level ordering for frustrated spin ladder models**

T. Hakobyan

Physics of Atomic Nuclei 2010 339-344

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*Article*

**Lobachevsky geometry of (super)conformal mechanics**

Tigran Hakobyan, Armen Nersessian

Physics Letters A 2009 1001-1004

<http://www.journals.elsevier.com/physics-letters-a>

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*Article*

**The cuboctahedric Higgs oscillator from the rational Calogero model**

Tigran Hakobyan, Armen Nersessian, Vahagn Yeghikyan

Journal of Physics A: Mathematical and Theoretical 2009 205206, 11

<http://iopscience.iop.org/journal/0305-4470>

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*Article*

**Cuboctahedric Higgs oscillator from the Calogero model**

Armen Nersessian, Tigran Hakobyan, Vahagn Yeghikyan

Journal of Physics A-Mathematical and Theoretical 2009 205206

<http://iopscience.iop.org/journal/1751-8121>

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*Article*

**Lobachevsky geometry of (super)conformal mechanics**

Armen Nersessian, Tigran Hakobyan

Physics Letters A 2009 1001-1004  
<http://www.journals.elsevier.com/physics-letters-a>

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*Article*

**Antiferromagnetic ordering of energy levels for a spin ladder with four-spin cyclic exchange: Generalization of the Lieb-Mattis theorem**

Tigran Hakobyan  
Physical Review B 2008 012407,4  
<http://journals.aps.org/prb/>

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*Article*

**Energy-level ordering and ground-state quantum numbers for a frustrated two-leg spin-1 /2 ladder**

Tigran Hakobyan  
Physical Review B 2007 214421,14  
<http://journals.aps.org/prb/>

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*Article*

**The ordering of energy levels for su(n) symmetric antiferromagnetic chains**

Tigran Hakobyan  
Nuclear Physics B 2004 575-594  
<http://www.journals.elsevier.com/nuclear-physics-b/>

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*Article*

**The possibility of gapless excitations in antiferromagnetic spin chains with long-range interactions**

T. Hakobyan  
Journal of Physics A: Mathematical and Theoretical 2003 L599-L604  
<http://iopscience.iop.org/journal/0305-4470>

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*Article*

**Phase diagram of the frustrated two-leg ladder model**

T. Hakobyan, J. H. Hetherington, M. Roger  
Physical Review B 2001 144433,17  
<http://journals.aps.org/prb/>

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*Article*

**Delocalization of states in two-component superlattices with correlated disorder**

T. Hakobyan, D. Sedrakyan, A. Sedrakyan, I. Gomez, F. Dominguez-Adame  
Physical Review B 2000 11432-11436  
<http://journals.aps.org/prb/>

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*Article*

**Bethe Ansatz and thermodynamic limit of affine quantum group invariant extensions of the t-J model**

T. Hakobyan, A. Avakyan, A. Sedrakyan, J. Ambjorn  
Journal of Mathematical Physics 1999 5687-5701  
<http://scitation.aip.org/content/aip/journal/jmp>

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*Article*

**The European Physical Journal B**

T. Hakobyan, V. Harutunyan, V. Gevorkyan, V. Makhov

EUROPEAN PHYSICAL JOURNAL B 1999 31-33

<http://epjb.epj.org/>

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*Article*

**Luminescence Excitation and Influence of Radiation on the Stimulated Processes in Corundum Crystals**

T. Hakobyan, V. Harutyunyan, E. Hakhverdyan, V. Gevorkyan, V. Grigoryan, V. Makhov

PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE 1999 623-629

[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1862-6319/homepage/2231\\_ed...](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1862-6319/homepage/2231_ed...)

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*Article*

**A family of affine quantum group invariant integrable extensions of the Hubbard Hamiltonian**

A. Avakyan, T. Hakobyan, A. Sedrakyan

Nuclear Physics B 1997 633-652

<http://www.sciencedirect.com/science/journal/05503213>

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*Article*

**Integrable Extensions of Hubbard Hamiltonian**

T. Hakobyan, A. Sedrakyan, A. Avakyan

International Journal of Modern Physics B 1997 3207-3222

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*Article*

**Spin chain Hamiltonians with affine  $U_q$  symmetry**

T. Hakobyan, A. Sedrakyan

Modern Physics Letters B 1996 250-254

<http://www.worldscientific.com/worldscinet/mplb>

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*Article*

**On the universal R-matrix of  $U_{q|2}$  at roots of unity**

T. Hakobyan, A. Sedrakyan

COMMUNICATIONS IN MATHEMATICAL PHYSICS 1996 157-171

<http://link.springer.com/journal/220>

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*Article*

**Lattice electrons in constant magnetic field: Bethe like ansatz**

T. Hakobyan, A. Sedrakyan

Modern Physics Letters A 1995 495-501

<http://www.worldscientific.com/worldscinet/mpla>

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*Article*

**Universal R matrix of  $U_{q|l}(n,m)$  quantum superalgebras**

T. Hakobyan, A. Sedrakyan

Journal of Mathematical Physics 1994 2552-2559

<http://scitation.aip.org/content/aip/journal/jmp>

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*Article*

**R-matrices for  $U_{qosp}(1, 2)$  for highest weight representations of  $U_{qosp}(1, 2)$  for general  $q$  and  $q$  an odd root of unity**



T. Hakobyan, A. Sedrakyan

Modern Physics Letters B 1993 266-271

<http://www.worldscientific.com/worldscinet/mplb>

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*Article*

**R-matrices for highest weight representations of  $sl_q(2, \mathbb{C})$  at roots of unity**

T. Hakobyan, A. Sedrakyan

Modern Physics Letters B 1993 27-32

<http://www.worldscientific.com/worldscinet/mplb>

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*Article*

**Some new spinor representations of quantum groups  $B_q(n)$ ,  $C_q(n)$ ,  $G_q(2)$**

T. Hakobyan, A. Sedrakyan

Journal of Mathematical Physics 1993 2554-2560

<http://scitation.aip.org/content/aip/journal/jmp>

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