

# Hakob AVETISYAN

PHONE: +374 98 706175

EMAIL: [hakobavetisian@gmail.com](mailto:hakobavetisian@gmail.com)

## WORK EXPERIENCE

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Current NOV 2020	Research Scientist at <b>AANL</b> , Yerevan, Armenia. <i>Theoretical research</i> Participating in a grant by Arm Science Committee (quantum technologies) and one by Phillip Moris international (faculty research)
APR 2016- JUNE 2023	Junior Research Scientist at <b>Institute for Physical Research</b> , Ashtarak, Armenia. <i>Theoretical research</i> Investigating the effects of atmosphere on two photon fields from SPDC source: two photon speckle, mode analysis, aberration analysis with the Zernike polynomials
JAN 2020-JUNE2021	Visiting Lecturer at <b>American University of Armenia</b> , Yerevan, Armenia. <i>Teaching, Mechanics</i> — Newtonian mechanics - algebra of vectors, kinematics, dynamics, energy, momentum, rotational motion, harmonic oscillator, etc.
JAN 2020-JUNE2020	Visiting Lecturer at <b>American University of Armenia</b> , Yerevan, Armenia. <i>Teaching, Introduction to Quantum Computing</i> — Various quantum algorithms for computation and communication. Implementations on Qiskit (IBM)
AUG 2018 – SEP 2020	Research Scientist, Director and Co-Founder at <b>Gate42 Quantum Computing Research Lab</b> , Yerevan, Armenia. <i>Research and Development</i> Implementations of quantum algorithms on different quantum programming platforms (Rigetti, IBM, etc.). The areas of applications include Quantum Chemistry, Quantum Cryptography and Error Mitigation Techniques.
JUNE 2020 – AUG 2020	Participated to <b>Quantum Bootcamp of Creative Destruction Lab</b> , Toronto, Canada.
JUNE 2019 – AUG 2019	Technical training with specialists from CDL, Rigetti, IBM, Xanadu and Dwave. Followed by a Business training with professionals from Rotman business school.
FEB 2019 - JUNE 2019	Visiting lecturer at <b>Russian-Armenian University</b> , Yerevan, Armenia. <i>Teaching, Quantum and Optical Information</i> Topics includes various quantum algorithms for computation and communication.
JAN-MAY 2018	Machine Learning Engineer at <b>Fimotech LLC</b> , Yerevan, Armenia Participated in machine learning projects including object detection, audio signal processing and keypoint regression
SEP 2009 - FEB 2012	Physics Teacher, at <b>High School N182</b> , Yerevan, Armenia Taught physics for 7-12 grad students
SEP 2009 - JUNE 2010	Physics Teacher, at <b>School N5</b> , Yerevan, Armenia Taught physics for 9-10 grad students
SEP 2005 - FEB 2010	Lab Assistant, at <b>Institute of Applied Problems of Physics</b> , Yerevan, Armenia

## EDUCATION

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MARCH 2016 PhD in PHYSICS, **Universidade Federal de Minas Gerais**, Belo Horizonte, Brazil  
Major: Quantum Optics  
Thesis: "[Propagation of Higer-Order Correlation Beams in Turbulent Atmosphere](#)"  
Advisor: Prof. Carlos H. MONKEN

| [Detailed List of Exams](#)

JULY 2006 MSc in BIOPHYSICS, **Yerevan State University**, Yerevan, Armenia  
Major: Bioinformatics

| [Detailed List of Exams](#)

JUNE 2004 BSc at **Yerevan State University**, Yerevan, Armenia  
Major: Solid State Physics

| [Detailed List of Exams](#)

## LANGUAGES

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ARMENIAN: Mothertongue  
ENGLISH: Good Working Knowledge  
RUSSIAN: Working Knowledge  
PORTUGUESE: Good Working Knowledge

## PUBLICATIONS

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H. Avetisyan, V. Mkrtchian, and A. E. Allahverdyan "*Advantages of one- and two-photon light in inverse scattering*", [Optics Letters](#) **48**, 3857 (2023)

H. Avetisyan, C. H. Monken, "*Mode analysis of higher-order transverse-mode correlation beams in turbulent atmosphere*", [Optics Letters](#) **42**, 101 (2017)

H. Avetisyan, C. H. Monken, "*Higher order correlation beams in atmosphere under strong turbulence conditions*", [Optics Express](#) **24**, 2318 (2016)

## GRANTS/AWARDS

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Grant No. 20TTAT-QTa003 – SCS of Armenia,

Grant for Faculty Research Funding Program 2022, – Enterprise Incubator Foundation and PMI Science.

[ANSEF 2019, special grant for young physicists after G. Askaryan](#)

## PROFILES

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[GitHub](#)  
[LinkedIn](#)  
[ResearchGate](#)

## SKILLS & EXPERTISE

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<b>Physics</b>	Quantum Optics, Quantum Mechanics, Quantum Information Science, Mathematical Physics, Theoretical Physics, Teaching, Statistical Physics, Theory of Coherence, Fourier Optics, Statistical Optics
<b>Mathematics</b>	Linear Algebra, Complex Analysis, Theory of Stationary Random Processes, Special Functions, Statistics, Probability Theory
<b>Programming</b>	Python, MATLAB, Mathematica
<b>Operating Systems</b>	Linux Ubuntu, MS Windows, Mac OS
<b>Libraries/APIs</b>	PyQuil, Qiskit, Strawberry Fields, TensorFlow/Keras, Theano/Lasagne

## PARTICIPATION IN CONFERENCES/SCHOOLS/WORKSHOPS

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MAOP: International College on Modern Applications of Optics and Photonics  
**Talk** "Some inverse Scattering Problems in Quantum Optics"  
Yerevan, August 12-23, 2024

NanoPQIQO: International conference  
**Talk** "Inverse Quantum Optical Scattering from Moving Dielectric"  
Yerevan, May 13-17, 2024

BLTP/JINR – KLTP/CAS: Joint Workshop on Physics of Strong Interacting Systems  
**Talk** "Advantages of one- and two-photon light in inverse Scattering"  
Yerevan, September 03-09, 2023

FOSDEM  
**Talk** "The role of open source in building quantum computing ecosystem"  
Brussels, Belgium, 2020

Global Innovation Forum  
**Talk** "The Practical Application Areas of Quantum Computing"  
Yerevan, Armenia, 2019

Science and Technology Convergence Conference  
**Talk** "How To Join the Quantum Computing Ecosystem"  
Yerevan, Armenia, 2019

Science and Technology Convergence Forum  
**Talk** "Current State of Quantum Computing"  
National Academy of Sciences, Yerevan, Armenia, 2018

Laser Physics-2018  
**Talk** "SPDC field in the atmosphere: two photon speckle, mode analysis, aberration analysis"  
Ashtarak, Armenia, 2018

International Advanced School in Frontiers in Optics and Photonics  
Yerevan-Ashtarak, Armenia, 2018

PICQUE Scientific School in Integrated Quantum Photonics Applications: from Simulation to Sensing

Talk “Correlation Beams in Turbulent Atmosphere”  
Rome, Italy, 2015

V Paraty Quantum Information School and Workshop  
Poster “Two Photon Speckle of Two Photon Fields in Strong Turbulent Media”  
Paraty, Brazil, 2015

XXXVIII ENFMC Brazilian Physical Society Meeting (OPTICS AND PHOTONICS).  
Talk “Propagation of Higher Order Correlation Beams in Turbulent Atmosphere”  
Foz do Iguaçu, Brazil, 2015

XIV Escola de Verão Jorge André Swieca de Ótica Quântica e Ótica Não Linear  
Recife, Brazil, 2014

IV Paraty Quantum Information School and Workshop  
Paraty, Brazil, 2013

Electrons, Positrons, Neutrons and X-Rays Scattering Under External Influences  
Meghri, Armenia, 2009

Nuclear Theory and Astrophysical Applications, JINR  
Dubna, Russia, 2005

## MILITARY SERVICE

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JUNE 2006 - JUNE 2008 Served in The Armenian Army: Sergeant

## CERTIFICATES

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Requirements for Large-Scale Universal Quantum Computation, 2020

Practical Realities of Quantum Computation and Quantum Communication, 2020

Quantum Machine Learning, University of Toronto, edX, 2019

Machine Learning course at Armenian Code Academy (ACA), Apr-Aug 2017

Stanford Online, Statement of Accomplishment for “Statistical Learning”

Stanford Online, Statement of Accomplishment for “Quantum Mechanics for Scientists and Engineers 2”

Stanford Online, Statement of Accomplishment for “Quantum Mechanics for Scientists and Engineers”

edX Honor Code Certificate for “Introduction to Probability - The Science of Uncertainty”

edX Honor Code Certificate for “Atomic and Optical Physics I part 1: Resonance”

edX Honor Code Certificate for “Quantum Mechanics and Quantum Computation”

edX Certificate for “Mastering Quantum Mechanics”

edX Honor Code Certificate for “Circuits and Electronics 1: Basic Circuit Analysis”

edX Honor Code Certificate for “Circuits and Electronics 2: Amplification, Speed, and Delay”

# PhD in PHYSICS

## Grades

EXAM	GRADE	CREDIT HOURS
Analytical Mechanics	B	90
Statistical Physics	A	90
Electrodynamics 1	A	90
Electrodynamics 2	A	90
Quantum Mechanics 1	A	90
Quantum Mechanics 2	A	90
Fundamentals of Quantum Mechanics in Quantum Optics	A	45
Theory of Coherence	A	10