

# Kuzanyan Astghik

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## WORK EXPERIENCE

### 1. Lecturer

Russian-Armenian University, Department of General Physics and Quantum Nanostructures (2021) - present

### 2. Junior researcher

Institutes for Physical Research of National Academy of Science of the Republic of Armenia (2017) – present

### 3. Laboratory assistant

Institutes for Physical Research of National Academy of Science of the Republic of Armenia (2009-2016)

### 4. Technical writer

Technology and Science Dynamics (2016-2017)

### 5. Technical writer

Professional engineering company InSol (2013-2016)

## EDUCATIONAL BACKGROUND

### 1. PhD Degree (2019)

Institutes for Physical Research National Academy of Science of the Republic of Armenia.  
*Theses: Development of the thermoelectric single-photon detector's detection pixel model*

### 2. Master's Degree (2011)

National Academy of Science of the Republic of Armenia, International Scientific-Educational Centre, Radioengineering and Telecommunication  
*Theses: Fractal patch antenna arrays.*

### 3. Bachelor's Degree (2009)

Yerevan State University, Department of Radiophysics.  
*Theses: Fractal antenna arrays.*

## AWARDS

1. **Best Presentation in Young Section** in International Conference Thermoelectrics and its Applications 2016, St. Petersburg, Russian Federation
2. Winner of **SPIE Education Scholarship** 2016
3. Winner of **Officer Travel Grant** for SPIE Optics + Photonics in August 2014, San Diego, USA

## **MEMBERSHIP OF PROFESSIONAL SOCIETIES**

1. Member of International Society of Optics & Photonics **SPIE** (2010 present)  
Vice president of Yerevan State University student chapter in 2013  
President of Yerevan State University student chapter in 2014  
Mentor of Yerevan State University student chapter (2020 present)
2. Member of The Optical Society of America **OSA** (2014 present)  
Vice president of Institutes for Physical Research Armenia OSA student chapter in 2019  
President of Institutes for Physical Research Armenia OSA student chapter in 2020
3. Member of International Commission for Optics **ICO** (2014 present)

## **SERVICE**

1. Coordinator of 7<sup>th</sup> International Symposium “Optics and its applications” 20-24 September, 2019, Ashtarak-Yerevan, Armenia
2. Head of Project 5<sup>th</sup> International Advanced School on Frontiers in Optics & Photonics 22-27 June, 2018, Yerevan-Ashtarak, Armenia
3. Member of organizing committee of 4<sup>th</sup> International Symposium “Optics and its applications” 25-28 July, 2016, Ashtarak-Yerevan, Armenia
4. Head of Project SPIE.FOCUS Armenia: 3<sup>rd</sup> International Symposium “Optics and its applications” 1-5 October, 2015, Ashtarak-Yerevan, Armenia
5. Member of organizing committee of 2<sup>nd</sup> International Symposium “Optics and its applications” (smr 2633) 1-5 September, 2014, Ashtarak-Yerevan, Armenia
6. First contact person of International Conference “IONS Armenia” 11-14 September, 2013, Yerevan-Ashtarak, Armenia
7. Member of organizing committee of International Symposium “Optics and its applications” 5-9 September, Ashtarak-Yerevan, Armenia
8. Member of organizing committee of International Workshop “Photonics and Micro- and Nano-Structured materials” held on June 27-30, 2011 Yerevan, Armenia

## **RESEARCH PROJECTS**

1. Ministry of Education and Science of Armenia State committee of science - 18T-2F134 “Thermoelectric single photon detector with high efficiency for application in telecommunication systems: selection of materials and detection pixel development”, 2018-2020.
2. Armenian National Science and Education Fund (ANSEF) - “Transition-Edge Sensors on the Basis of Re-entrant Superconductors”, 2016-2017.
3. Ministry of Education and Science of Armenia State committee of science - 15RF-018 “Preparation and investigation of solid solutions of rare-earth hexaborides for using in low-temperature thermoelectric devices”, 2015-2017.
4. European Commission’s 7th Framework Program - FP7-NMP-310750 “Development of Multifunctional Thermal Barrier Coatings and Modeling”, 2013-2015.

## PUBLICATIONS' LIST

1. **A. A. Kuzanyan**, S. I. Petrosyan, A. S. Kuzanyan, and G. R. Badalyan “The Use of Silicon Dioxide Films as Anti-Reflective Coating of Thermoelectric Single-Photon Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 55(4), pp. 364–369, (2020). DOI: 10.3103/S1068337220040106
2. **A. A. Kuzanyan**, A. S. Kuzanyan, S. I. Petrosyan, V. S. Kuzanyan and G. R. Badalyan “Electron Beam Deposition of Lanthanum Hexaboride Films for Usage as Anti-Reflective Coating” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 55(2), pp. 240–250, (2020). DOI: 10.3103/S1068337220020073
3. **A.A. Kuzanyan**, V.R. Nikoghosyan and A.S. Kuzanyan “Simulation of Heat Propagation Processes Taking Place in the Detection Pixel of Thermoelectric Single Single-Photon Detector” *IEEE Sensors Journal*, 20(21), pp. 12776 – 12782, (2020). DOI: 10.1109/JSEN.2020.3000608
4. **A.A. Kuzanyan**, V.R. Nikoghosyan and A.S. Kuzanyan “More than one photon detection using four-layer thermoelectric single-photon detector” *Proc. of SPIE* 11354, Optical Sensing and Detection VI, 1135428 (2020). DOI: 10.1117/12.2555452
5. **A.A. Kuzanyan**, V.R. Nikoghosyan and A.S. Kuzanyan “Modeling and Simulation of Ultrafast and Highly Efficient Single Photon Detection from Infrared to Ultraviolet” *IEEE Sensors Journal*, 20(6), pp. 3040-3046, (2020). DOI: 10.1109/JSEN.2019.2957603
6. A.S. Kuzanyan, **A.A. Kuzanyan**, V.N. Gurin, M.P. Volkov, V.R. Nikoghosyan. “High-Efficiency Thermoelectric Single-Photon Detector Based on Lanthanum and Cerium Hexaborides”. *Semiconductors*, Vol. 53, No. 5, pp. 682–685, (2019). DOI: 10.1134/S1063782619050130
7. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan. “Four-Layer Detection Pixel of Single-Photon Thermoelectric Detector”. *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 54(2), 236–248, (2019). DOI: 10.3103/S1068337219020099
8. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan “A high-performance thermoelectric single-photon detector for telecom wavelengths” *Proc. of SPIE*, vol. 11027, (2019). DOI: 10.1117/12.2520105
9. A.S. Kuzanyan, **A.A. Kuzanyan**, V.R. Nikoghosyan “Three-layer detection pixel of single-photon thermoelectric detector based on rare-earth hexaborides” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 53, No 4, pp. 338–350, (2018). DOI:10.3103/S1068337218040096
10. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan “Single-Layer Detection Pixel of Single-Photon Thermoelectric Detector Based on Rare-Earth Hexaborides” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 53, No. 3, pp. 242–251, (2018). DOI: 10.3103/S106833721803009X
11. S.I. Petrosyan, **A.A. Kuzanyan**, G.R. Badalyan, A.S. Kuzanyan “Preparation and Investigation of the Properties of W/CeB<sub>6</sub>/W Heterostructure as a Sensitive Element of Single-Photon Thermoelectric Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 53, No. 2, pp. 157–165, (2018). DOI: 10.3103/S1068337218020081
12. **A.A. Kuzanyan**, V.R. Nikoghosyan, A.S. Kuzanyan “Simulation of Heat Propagation Processes in the Detection Pixel with Superconducting Layers of Single-Photon

- Thermoelectric Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 53, No. 1, pp. 96–110, (2018). DOI: 10.3103/S1068337218010097
13. **A.A. Kuzanyan**, V.R. Nikoghosyan, A. S. Kuzanyan “Investigation of the Processes of Heat Propagation in W/FeSb<sub>2</sub>/W Detection Pixel of the Single Photon Thermoelectric Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 52, No. 3, pp. 249–257, (2017). DOI: 10.3103/S1068337217030100
  14. **A.A. Kuzanyan**, A.S. Kuzanyan, G.R. Badalyan, S.I. Petrosyan, V.O. Vardanyan, V.N. Gurin, M.P. Volkov, S.Kh. Pilosyan “CeB<sub>6</sub> Thin Films Produced on Different Substrates by Electron-Beam Deposition” ISSN 1063-7826, *Semiconductors*, vol. 51, No. 8, pp. 999–1001, (2017). DOI: 10.1134/S1063782617080176
  15. A.S. Kuzanyan, **A.A. Kuzanyan**, V.R. Nikoghosyan, V.N. Gurin, M.P. Volkov “Prospects of using rare-earth hexaborides in thermoelectric single-photon detectors” ISSN 1063-7826, *Semiconductors*, vol. 51, No. 7, pp. 870–873, (2017). DOI: 10.1134/S1063782617070235.
  16. A.S. Kuzanyan, V.R. Nikoghosyan, **A.A. Kuzanyan**, “An ultrafast thermoelectric sensor for single-photon detection in a wide range of the electromagnetic spectrum” *Proc. of SPIE* vol. 10229, 102290P, (2017). DOI: 10.1117/12.2264543
  17. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan “Ultra-fast Sensor for Single-photon Detection in a Wide Range of the Electromagnetic Spectrum” *Sensors & Transducers*, vol. 207(12), pp. 21-29, (2016).
  18. A.S. Kuzanyan, **A.A. Kuzanyan**, Pulsed Laser Deposition of Large-Area Thin Films and Coatings, Chapter in the book “*Applications of Laser Ablation - Thin Film Deposition, Nanomaterial Synthesis and Surface Modification*”, ISBN 978-953-51-2812-0, edited by Dongfang Yang, INTECH, pp. 149-173, (2016).
  19. **A.A. Kuzanyan**, “Computer Simulation of Heat Distribution Processes in W/(La,Ce)B<sub>6</sub>/W Sensor of Thermoelectric Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 51(4), pp. 360–370, (2016). DOI: 10.3103/S1068337216040083
  20. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan, V.N. Gurin, M.P. Volkov “Investigation of Processes of Heat Propagation in Multilayer Sensor of Thermoelectric Single-Photon Detector” *Journal of Contemporary Physics (Armenian Academy of Sciences)*, vol. 51(2), pp. 181–190, (2016). DOI: 10.3103/S1068337216020122
  21. **A.A. Kuzanyan**, A.S. Kuzanyan, V.R. Nikoghosyan “Ultrafast TSPD on the basis of CeB<sub>6</sub> sensor” *Journal of Physics: Conference Series* 673, 012007, (2016). DOI:10.1088/1742-6596/673/1/012007
  22. K.M. Makeev, V.N. Gurin, L.I. Derkachenko, M.P. Volkov, A.S. Kuzanyan, **A.A. Kuzanyan**, T.B. Popova, E.V. Ivanova “Obtaining of crystals of polyelemental solid solutions of rare earth hexaborides”, *Technical Physics Letters* 42(1):1-3, (2016). DOI: 10.1134/S1063785016010120
  23. A.S. Kuzanyan, V.R. Nikoghosyan, **A.A. Kuzanyan**, “Modeling of kinetic processes in thermoelectric single photon detectors” *Proc. SPIE 9504, Photon Counting Applications*, 950400 (2015). DOI:10.1117/12.2178673

24. A.S. Kuzanian, V.R. Nikoghosyan, **A.A. Kuzanyan**, “CeB<sub>6</sub> Sensor for Thermoelectric Single-Photon Detector” *Sensors & Transducers*, vol. 191(8), pp. 57-62, (2015).
25. A.S. Kuzanyan, **A.A. Kuzanyan**, V.A. Petrosyan, S.Kh. Pilosyan, A.Z. Grasiuk, “A simple solution to the problem of effective utilization of the target material for pulsed laser deposition of thin films”, *Quantum Electronics* 43 (12), pp.1170 – 1174, (2013). DOI:10.1070/QE2013v043n12ABEH015194
26. **A.A. Kuzanyan**, A.S. Kuzanyan "Thermoelectric nanowire single-photon detector", *Proc. SPIE 8773, Photon Counting Applications IV; and Quantum Optics and Quantum Information Transfer and Processing*, 87730L (2013). DOI:10.1117/12.2016987;http://dx.doi.org/10.1117/12.2016987
27. **A.A. Kuzanyan**, V.A. Petrosyan And A.S. Kuzanyan, “Methods for pulsed laser deposition of large-area films using more than one target” *International Journal of Modern Physics: Conference Series*, vol. 15, pp. 170 –178, (2012). DOI: 10.1142/S2010194512007118
28. **A.A. Kuzanyan**, V.A. Petrosyan and A.S. Kuzanyan, “Thermoelectric single-photon detector” *Journal of Physics, Conference Series*: vol. 350 N 012028, (2012). DOI:10.1088/1742-6596/350/1/012028

## PATENTS' LIST

1. Armen Kuzanyan, **Astghik Kuzanyan**, Vahan Nikoghosyan “Thermoelectric detector multilayer sensor” № 3230, IPC - G01J5/00, (2018).
2. Armen Kuzanyan, **Astghik Kuzanyan**, Vahan Nikoghosyan “Thermoelectric detector multilayer sensor” № 3043, IPC - G01J5/00, (2016).
3. Armen Kuzanyan, **Astghik Kuzanyan**, Vahan Nikoghosyan “Multi-layer sensor of thermoelectric detector” № 2946, IPC - G01J5/00; (2015).
4. Armen Kuzanyan, **Astghik Kuzanyan**, Ashot Petrosyan, Silva Petrosyan, Vassilis Stathopoulos “Multi-layer coating of thermal barrier” № 2897, IPC - C23C 4/00; (2014).
5. Armen Kuzanyan, **Astghik Kuzanyan**, Vahagn Petrosyan “System for production of thin films” № 2737, IPC - C23C 14/00, C30B 23/00, B23B 33/0; (2013).
6. Armen Kuzanyan, Vahagn Petrosyan, **Astghik Kuzanyan** “Device to produce thin films” № 2531, IPC - C23C 14/00, C30B 23/00, B32B 33/00; (2011).

## ATTENDED CONFERENCES

1. **SPIE Photonics Europe**, 6 - 10 April, 2020, Digital Forum.
2. **Winter College on Optics: Quantum Photonics and Information** | (smr 3424) 10 - 21 February 2020, Trieste, Italy.
3. **7<sup>th</sup> International Symposium Optics & its Applications**, 20 - 24 September, 2019 Yerevan-Ashtarak, Armenia.
4. International Conference **Laser Physics 2019**, 17 – 20 September 2019, Ashtarak, Armenia.
5. European Conference **SPIE Optics and Optoelectronics 2019** 1 - 4 April 2019, Prague, Czech Republic.
6. International Conference **Laser Physics 2018**, 18 – 21 September 2018, Ashtarak, Armenia.

7. IX International Conference for Professionals and Young Scientists **Low Temperature Physics - ICPYS LTP 2018**, June 4-8, 2018, Kharkiv, Ukraine.
8. 6<sup>th</sup> International Symposium **Optics & its Applications**, February 17-20, 2018, Trento, Italy.
9. International Conference **Laser Physics 2017**, 19 – 22 September 2017, Ashtarak, Armenia.
10. European Conference **SPIE Optics and Optoelectronics 2017** 24 - 27 April 2017, Prague, Czech Republic.
11. **Winter College on Optics: Advanced Optical Techniques for Bio-imaging** | (smr 3104) 13-24 February 2017, Trieste, Italy.
12. International Conference **Thermoelectrics and its applications-2016** 15-16 November 2016, Saint Petersburg, RF.
13. 4th International Conference “**Nanotechnologies**” **Nano –2016** October 24 –27, 2016, Tbilisi, Georgia.
14. 4<sup>th</sup> International Symposium **Optics & its Applications**, July 25-28, 2016 Yerevan-Ashtarak, Armenia.
15. **OPTO-Meeting for Young Researchers & SPIE/OSA Student Chapter Meeting 2016** 06 - 09 June 2016, Gdansk, Poland.
16. International Conference **Laser Physics 2015** 6-9 October 2015, Ashtarak, Armenia
17. SPIE.FOCUS Armenia: 3rd International Symposium “**Optics and its applications**” 1-5 October, 2015, Ashtarak-Yerevan, Armenia.
18. **Single Photon Workshop 2015**, 13-17 July, 2015, Geneva, Switzerland.
19. European Conference **SPIE Optics and Optoelectronics 2015**, 13-16 April, 2015, Prague, Czech Republic.
20. International Young Scientist Conference **Developments in Optics and Communications (DOC Riga)** 8-10 April, 2015, Riga, Latvia.
21. 2<sup>nd</sup> International Symposium on **Optics and its Applications (smr 2633)**, 1-5 September, 2014, Yerevan-Ashtarak, Armenia.
22. International Conference **Laser Physics 2013**, 8-11 October, 2013, Ashtarak, Armenia.
23. International Conference **IONS Armenia**, 11-14 September, 2013, Yerevan-Ashtarak, Armenia.
24. European Conference **SPIE Optics and Optoelectronics 2013**, 15-18 April, 2013, Prague, Czech Republic.
25. International Conference **Laser Physics 2012**, 9-12 October, 2012, Ashtarak, Armenia.
26. International Conference **IONS 12**, 4-7 July, 2012, Naples, Italy.
27. International Conference **Laser Physics 2011**, 11-14 October, 2011, Ashtarak, Armenia.
28. International Symposium **Optics and its applications**, 5-9 September, 2011, Yerevan-Ashtarak, Armenia.

## LANGUAGES

Armenian, Russian, English