

# Vram Nerses Mughnetsyan

Research Institute of Physics  
Group Leader

☎ 37455245701  
37493245700

✉ vram@ysu.am

## 🎓 Education

---

<b>Institution</b>	Yerevan State University
<b>Faculty</b>	Faculty of Physics
<b>Date</b>	1999 - 2008
<b>Degree name</b>	PhD student

---

## 🎓 Scientific Rank/degree

---

<b>Institution</b>	Yerevan State University
<b>Date</b>	2008
<b>Degree name</b>	Candidate
<b>Specialty</b>	Physico-mathematical sciences
<b>Scientific Supervisor</b>	A.A. Kirakosyan
<b>Research Topic</b>	Theoretical investigation of the effects of interdiffusion and external fields on electronic and optical properties of semiconductor nanostructures

---

## 🌐 Language skills

---

Հայերեն English Русский

---

## 📁 Work experience

---

<b>Institution</b>	Center of Modeling and Simulations of Nanostructures
<b>Period of time</b>	2023 till now
<b>Rank/degree</b>	head of the research group

---

<b>Institution</b>	Research Laboratory of the Solid State Physics, Yerevan State University
<b>Period of time</b>	2022 - 2023
<b>Rank/degree</b>	Senior Researcher

---

<b>Institution</b>	Chair of Solid State Physics
<b>Period of time</b>	2016 - 2023
<b>Rank/degree</b>	Head of Educational Laboratory

---

**Institution** Department of Medical Physics, Yerevan State Medical University after Mkhitar Hetatsi  
**Period of time** 2015 till now  
**Rank/degree** Lecturer

---

**Institution** Research Laboratory of the Solid State Physics, Yerevan State University  
**Period of time** 2008 - 2022  
**Rank/degree** Researcher

---

## Publications

---

*Article*

**Effect of two-dimensional non-local screening on characteristics of transition metal dichalcogenide monolayers**

Vram Mughnetsyan, Aram Manaselyan, Ashot Movsisyan, Albert Kirakosyan

Semiconductor Science and Technology 2024 045016

---

*Article*

**Planar quantum dots: Theoretical approaches**

Aram Manaselyan, Vram Mughnetsyan, Albert Kirakosyan

Encyclopedia of Condensed Matter Physics (Second Edition) 2024 297-307

---

*Article*

**Magneto-optical properties of a quantum dot array interacting with a far-infrared photon mode of a cylindrical cavity**

Vidar Gudmundsson, Vram Mughnetsyan, Hsi-Sheng Goan, Jeng-Da Chai, Nzar Rauf Abdullah,

Chi-Shung Tang, Valeriu Moldoveanu, Andrei Manolescu

Physical Review B 2024 235306

---

*Article*

**Magnetic Properties of A Cavity-Embedded Square Lattice of Quantum Dots or Antidots**

Vram Mughnetsyan, Vidar Gudmundsson, Nzar Rauf Abdullah, Chi-Shung Tang, Valeriu Moldoveanu,

Andrei Manolescu

Annalen der Physik 2024 2300274

---

*Article*

**Tuning of paramagnetic and diamagnetic cavity photon excitations in a square array of quantum dots in a magnetic field**

Vram Mughnetsyan, Vidar Gudmundsson, Hsi-Sheng Goan, Jeng-Da Chai, Nzar Rauf Abdullah,

Chi-Shung Tang, Valeriu Moldoveanu, Andrei Manolescu

Physical Review B 2024 205301

---

*Article*

**MAGNETO-OPTICAL PROPERTIES OF ARRAYED STRUCTURES OF CYLINDRICAL AND ELLIPTICAL QUANTUM DOTS**

Lilit YEGANYAN, Vram MUGHNETSYAN, Maryam MANSOURY

NANOCON Conference Proceedings - International Conference on Nanomaterials 2024 64-69

---

*Article*

**Controlling the excitation spectrum of a quantum dot array with a photon cavity**

Vidar Gudmundsson, Vram Mughnetsyan, Nzar Rauf Abdullah, Chi-Shung Tang, Valeriu Moldoveanu,

Andrei Manolescu

Physical Review B 2023 115306

---

*Article*

**Hofstadter-like spectrum and magnetization of artificial graphene constructed with cylindrical and elliptical quantum dots**

Maryam Mansoury, Vram Mughnetsyan, Aram Manaselyan, Albert Kirakosyan, Vidar Gudmundsson,

Vigen Aziz-Aghchegala

Physics Letters A 2023 129115

---

*Article*

**Unified approach to cyclotron and plasmon resonances in a periodic two-dimensional GaAs electron gas hosting the Hofstadter butterfly**

Vram Mughnetsyan, Vidar Gudmundsson, Nzar Rauf Abdullah, Chi-Shung Tang, Valeriu Moldoveanu,

Andrei Manolescu

Physical Review B 2022 155302

---

*Article*

**Signature of miniband nodes in magneto-optical properties of one-dimensional superlattice of planar quantum rings**

Maryam Mansoury, Vigen Aziz-Aghchegala, Vram Mughnetsyan, Albert Kirakosyan, Vidar Gudmundsson

Physics Letters A 2022 128324

---

*Article*

**Electron-hole interaction in cylindrical quantum dots**

Vram Mughnetsyan, Ashot Movsisyan, Albert Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2022 115366

---

*Article*

**Effects of a far-infrared photon cavity field on the magnetization of a square quantum dot array**

Vidar Gudmundsson, Vram Mughnetsyan, Nzar Rauf Abdullah, Chi-Shung Tang, Valeriu Moldoveanu,

Andrei Manolescu

Physical Review B 2022 115308

---

*Article*

**Electronic and Magnetic Properties of Laser Dressed Quantum Dot and Ring with Rashba Spin-Orbit Coupling**

Vram Mughnetsyan, Aram Manaselyan, Manuk Barseghyan, Albert Kirakosyan, Laura M. Perez,

David Laroze

Springer Proceedings in Physics (Optics and Its Applications) 2022 145-154

---

*Article*

**Interminiband absorption in a quantum ring superlattice in magnetic field with periodic vector potential**

Vram Mughnetsyan, Ara Atayan, Albert Kirakosyan, Vigen Aziz-Aghchegala

Article

**Control of electronic and optical properties of a laser dressed double quantum dot molecule by lateral electric field**

M.G. Barseghyan, V.N. Mughnetsyan, H.M. Baghranyan, F. Urgan, L.M. Perez, D. Laroze

Physica E: Low-dimensional Systems and Nanostructures 2020 114362(1-7)

---

Article

**Tuning of energy gap and 1D Dirac-like points in artificial graphene and boron nitride monolayer by an external electric field**

Vram Mughnetsyan

Micro and Nanostructures (Previously known as Superlattices and Microstructures) 2020 106700

---

Article

**Effect of anisotropic strain on the electronic characteristics of an InAs/GaAs honeycomb superlattice**

Vram Mughnetsyan, Albert Kirakosyan

Micro and Nanostructures (Previously known as Superlattices and Microstructures) 2019 243-251

---

Article

**Effect of the impurity on the Aharonov-Bohm oscillations and the intraband absorption in GaAs/ Ga1-xAlxAs quantum ring under intense THz laser field**

M.G. Barseghyan, V.N. Mughnetsyan, L.M. Perez, A.A. Kirakosyan, D. Laroze

Physica E: Low-dimensional Systems and Nanostructures 2019 91-97

---

Article

**Exciton-Exciton Interactions in Coaxial Double Quantum Rings**

Vram Mughnetsyan, Vanik Shahnazaryan, Ivan Shelykh, Hayk Sarkisyan

Nanomaterials 2019 1469(1-13)

---

Article

**Rashba splitting of Dirac points and symmetry breaking in strained artificial graphene**

Vram Mughnetsyan, Aram Manaselyan, Manuk Barseghyan, Albert Kirakosyan, David Laroze

Physical Review B 2019 195132(1-8)

---

Article

**Effect of interdiffusion and external magnetic field on electronic states and light absorption in Gaussian-shaped double quantum ring**

V.L. Aziz Aghchegala, V.N. Mughnetsyan, A.A. Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2018 11-16

---

Article

**EFFECT OF DONOR IMPURITY ON AHARONOV-BOHM OSCILLATIONS IN A DOUBLE QUANTUM RING WITH GAUSSIAN CONFINEMENT**

V. N. MUGHNETSYAN

Proceedings of the YSU A. Physical and Mathematical Sciences 2018 205-212

---

Article

**Effect of interdiffusion and magnetic field on two-electron states in Gaussian-shaped double**

## **quantum rings**

V.L. Aziz Aghchegala, V.N. Mughnetsyan, A.A. Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2017 157-163

<http://www.journals.elsevier.com/physica-e-low-dimensional-systems-and-nanostru...>

---

### *Article*

#### **Effect of Rashba spin-orbit coupling and external magnetic field on electronic minibands in highly strained one-layer quantum ring superlattice**

Vram Mughnetsyan, Aram Manaselyan, Albert Kirakosyan

Micro and Nanostructures (Previously known as Superlattices and Microstructures) 2017 10-18

<http://www.journals.elsevier.com/superlattices-and-microstructures>

---

### *Article*

#### **Strain distribution and band structure of InAs/GaAs quantum ring superlattice**

Vram Mughnetsyan, Albert Kirakosyan

Micro and Nanostructures (Previously known as Superlattices and Microstructures) 2017 318-327

---

### *Article*

#### **Elastic strain distribution in one layer quantum ring superlattice**

V.N. Mughnetsyan, A.A. Kirakosyan

Proceedings of the YSU A. Physical and Mathematical Sciences 2017 121-123

---

### *Article*

#### **Rashba Spin-Orbit Coupling in a Two-Dimensional Quantum Ring Superlattice**

V. Mughnetsyan, A. Manaselyan, A. Kirakosyan

Micro and Nanostructures (Previously known as Superlattices and Microstructures) 2015 584-591

<http://www.journals.elsevier.com/superlattices-and-microstructures>

---

### *Article*

#### **Electron capture processes in quantum dots due to one-and two-phonon assisted transitions: The role of optical phonon confinement**

A L Vartanian, K A Vardanyan, V N Mughnetsyan, A A Kirakosyan

Journal of Physics: Conference Series 2015 012017/4pp

<http://iopscience.iop.org/journal/1742-6596>

---

### *Article*

#### **Effect of phonon confinement on one- and two-polar optical phonon capture processes in quantum dots**

K.A. Vardanyan, A.L. Vartanian, V.N. Mughnetsyan, A.A.Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2015 268-274

<http://www.journals.elsevier.com/physica-e-low-dimensional-systems-and-nanostru...>

---

### *Article*

#### **Effect of interdiffusion on electronic states of strain-free Gaussian-shaped double quantum ring superlattice**

V.L. Aziz Aghchegala, V.N. Mughnetsyan, A.A. Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2015 30-35

<http://www.journals.elsevier.com/physica-e-low-dimensional-systems-and-nanostru...>

---

### *Article*

**Effect of interdiffusion on nonlinear intraband light absorption in Gaussian-shaped double quantum rings**

V.L. Aziz Aghchegala, V.N. Mughnetsyan, A.A. Kirakosyan

Physica E: Low-dimensional Systems and Nanostructures 2015 210-216

<http://www.journals.elsevier.com/physica-e-low-dimensional-systems-and-nanostru...>

---

*Article*

**Effect of interdiffusion on band structure in GaAs/Ga<sub>1-x</sub>Al<sub>x</sub>As quantum ring superlattices**

V. Mughnetsyan, A. Kirakosyan, A. Manaselyan

6-th International Conference on Nanomaterials, NANOCON-2014, Conference Proceedings 2015 47-53

[http://nanocon2014.tanger.cz/files/proceedings/20/index\\_en.htm](http://nanocon2014.tanger.cz/files/proceedings/20/index_en.htm)

---

*Conference*

**Elastic Strain Distribution in one layer InAs/GaAs Quantum Ring Superlattice.**

V.N. Mughnetsyan, A.A. Kirakosyan

---

*Conference*

**Electron capture processes in quantum dots due to one- and two-phonon assisted transitions:**

**The role of optical phonon confinement.**

A.L. Vartanian, K.A. Vardanyan, V.N. Mughnetsyan, A.A. Kirakosyan

---

*Conference*

**Magneto-optical properties of arrayed structures of quantum dots and rings**

Yeganyan Lilit, Mughnetsyan Vram, Mansoury Maryam

---

*Conference*

**Magneto-Optical Properties of Artificial Graphene Constructed of Cylindrical and Elliptical Quantum Dots**

YEGANYAN Lilit, MUGHNETSYAN Vram, MANSOURY Maryam, KIRAKOSYAN Albert, GUDMUNDSSON Vidar

---