

# Гамлет Кароевич Аветисян

## Научно-исследовательский институт физики

Руководитель центра

☎ 37491004909

23-92

(060) 71-03-92

✉ avetissian@ysu.am



## 🎓 Образование

Учреждение	Ереванский государственный университет
Факультет	Физический факультет, кафедра теоретической физики
Дата	1962 - 1967
Степень / Звание	Квалифицированный специалист

## 🎓 Ученое звание/Ученая степень

Учреждение	Государственный комитет народного образования СССР, Москва
Дата	1991
Степень / Звание	Профессор
Специальность	Физико-математические науки

Учреждение	ФИАН СССР им. П.Н. Лебедева, отдел теоретической физики им. И.Е. Тамма, Москва
Дата	1983
Степень / Звание	Доктор наук
Специальность	Физико-математические науки
Научная тема	Взаимодействие заряженных частиц с интенсивным электромагнитным излучением

## 🌐 Знание языков

Հայերեն Русский English

## 📁 Опыт работы

Учреждение	Ереванский государственный университет
Период времени	1971 до настоящего времени
Звание/степень	Директор, научный руководитель Центра физики сильных полей

## 🔍 Научные интересы

- Релятивистская нелинейная электродинамика, дираковский вакуум в сверхсильных полях, физика плазмы, лазерный ускоритель, рентгеновские и гамма-лазеры, нелинейная электродинамика наноструктур

---

## Публикации

---

Статья

### **Intense high-order harmonic generation in the giant fullerene molecule C<sub>240</sub>**

H. K. Avetissian, S. Sukiasyan, T. M. Markosyan, G. F. Mkrtchian

Physical Review B 2024 085401

---

Статья

### **Intense anomalous high harmonics in graphene quantum dots caused by disorder or vacancies**

H. K. Avetissian, G. A. Musayelyan, G. F. Mkrtchian

Physical Review B 2024 085417

---

Статья

### **Graphene valley polarization as a function of carrier-envelope phase in few-cycle laser pulses and its footprints in harmonic signals**

H. K. Avetissian, V. A. Sedrakyan, Kh. V. Sedrakian, G. F. Mkrtchian

Physical Review B 2023 205403

---

Статья

### **Disorder-induced effects in high-harmonic generation process in fullerene molecules**

H.K. Avetissian, S. Sukiasyan, H.H. Matevosyan, G.F. Mkrtchian

Results in Physics 2023 106951/8

---

Статья

### **Long-range correlation-induced effects at high-order harmonic generation on graphene quantum dots**

H. K. Avetissian, A. G. Ghazaryan, Kh. V. Sedrakian, G. F. Mkrtchian

Physical Review B 2023 165410

---

Статья

### **High-order harmonic generation in three-dimensional Weyl semimetals with broken time-reversal symmetry**

H. K. Avetissian, V. N. Avetisyan, B. R. Avchyan, G. F. Mkrtchian

Physical Review A 2022 033107/1-8

---

Статья

### **Efficient high-harmonic generation in graphene with two-color laser field at orthogonal polarization**

Hamlet K. Avetissian, Andreas Knorr, Garnik F. Mkrtchian

Physical Review B 2022 195405

---

Статья

### **Saddle-point exciton signature on high-order harmonic generation in two-dimensional hexagonal nanostructures**

H. K. Avetissian, S. S. Israelyan, H. H. Matevosyan, G. F. Mkrtchian  
Physical Review A 2022 063504/1-9

---

*Статья*

**Free-electron nanolaser based on graphene plasmons**

H. K. Avetissian, B. R. Avchyan, H. H. Matevosyan, G.F. Mkrtchian

Laser Physics 2021 055801

---

*Статья*

**High harmonic generation in fullerene molecules**

H. K. Avetissian, A. G. Ghazaryan, G. F. Mkrtchian

Physical Review B 2021 125436

---

*Статья*

**High-harmonic generation at particle-hole multiphoton excitation in gapped bilayer graphene**

Hamlet K. Avetissian, Ara K. Avetissian, Armenuhi G. Ghazaryan, Garnik F. Mkrtchian,

Khachik V. Sedrakian

Journal of Nanophotonics 2020 026004(1-15)

---

*Статья*

**Many-body effects for excitonic high-order wave mixing in monolayer transition metal dichalcogenides**

H. K. Avetissian, G. F. Mkrtchian, K. Z. Hatsagortsyan

Physical Review Research 2020 023072(1-9)

---

*Статья*

**On the extreme nonlinear optics of graphene nanoribbons in the strong coherent radiation fields**

Hamlet K. Avetissian, Babken R. Avchyan, Garnik F. Mkrtchian, Karine A. Sargsyan

Journal of Nanophotonics 2020 026018(1-9)

---

*Статья*

**High laser harmonics induced by the Berry curvature in time-reversal invariant materials**

H. K. Avetissian, G. F. Mkrtchian

Physical Review B 2020 245422

---

*Статья*

**Microscopic quantum description of second-order nonlinearities in two-dimensional hexagonal nanostructures beyond the Dirac cone approximation**

H. K. Avetissian, G. F. Mkrtchian, K. G. Batrakov, S. A. Maksimenko

Physical Review B 2020 165406

---

*Статья*

**Higher harmonic generation by massive carriers in buckled two-dimensional hexagonal nanostructures**

H. K. Avetissian, G. F. Mkrtchian

Physical Review B 2019 085432(1-10)

---

*Статья*

**Wave mixing and high harmonic generation at two-color multiphoton excitation in two-**

**dimensional hexagonal nanostructures**

H. K. Avetissian, A. K. Avetissian, B. R. Avchyan, G. F. Mkrtchian

Physical Review B 2019 035434(1-8)

---

*Статья*

**Impact of electron-electron Coulomb interaction on the high harmonic generation process in graphene**

H. K. Avetissian, G. F. Mkrtchian

Physical Review B 2018 115454(1-9)

---

*Статья*

**Multiphoton excitation and high-harmonics generation in topological insulator**

H. K. Avetissian, A. K. Avetissian, B. R. Avchyan, G. F. Mkrtchian

JOURNAL OF PHYSICS-CONDENSED MATTER 2018 185302(1-7)

---

*Статья*

**Laser synthesis of hybrid nanoparticles for biomedicine**

A.A. Lalayan, H.K. Avetissian

Proceedings of SPIE-Progress in Biomedical Optics and Imaging 2018 10582(1-4)

---

*Статья*

**Multiphoton excitation and harmonic generation from the quantum electrodynamic vacuum**

H. K. Avetissian, A. K. Avetissian, B. R. Avchyan, G. F. Mkrtchian

Laser Physics Letters 2018 126003(1-7)

---

*Статья*

**High harmonic generation in Landau-quantized graphene subjected to a strong electromagnetic radiation**

Hamlet K. Avetissian, Armenuhi G. Ghazaryan, Garnik F. Mkrtchian, Khachik V. Sedrakian

Journal of Nanophotonics 2017 016004: 1- 9

<https://spie.org/publications/journals/journal-of-nanophotonics>

---

*Статья*

**Collective two-boson decay of excitons in a Bose-Einstein condensate and generation of coherent photon-phonon radiation**

H. K. Avetissian, A. K. Avetissian, G. F. Mkrtchian, B. R. Avchyan

Physical Review B 2017 045206/6

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

---

*Статья*

**Coherent nonlinear optical response of graphene in the quantum Hall regime**

H.K. Avetissian, G.F. Mkrtchian

Physical Review B 2016 045419/7

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

---

*Статья*

**Enhanced high-order-harmonic generation and wave mixing via two-color multiphoton excitation of atoms and molecules**

H.K. Avetissian, B.R. Avchyan, G.F. Mkrtchian

Physical Review A 2016 013856/7

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

---

*Статья*

**Electron diffraction on a traveling wave: “Inelastic Kapitza-Dirac effect”**

H.K. Avetissian

Laser and Particle Beams 2016 1-13

<http://iopscience.iop.org/journal/1612-202X>

---

*Статья*

**Generation of high energy electron and positron beams in solid-plasma-nanolayers under relativistic laser pulses**

H.K. Avetissian, A.K. Avetissian, H.H. Matevosyan, G.F. Mkrtchian, Kh.V. Sedrakian

News and Reports from High Energy Density generated by Heavy Ion and Laser Beams 2015 2016 t2-77

[https://repository.gsi.de/record/194814/files/HEDP\\_report\\_\\_2k15\\_web-version.pdf](https://repository.gsi.de/record/194814/files/HEDP_report__2k15_web-version.pdf)

---

*Статья*

**Nonlinear absorption of high-intensity x-ray radiation in ultradense plasma**

H.K. Avetissian, A.K. Avetissian, A.G. Ghazaryan, H.H. Matevosyan, G.F. Mkrtchian

News and Reports from High Energy Density generated by Heavy Ion and Laser Beams 2015 2016 t2 -78

[https://repository.gsi.de/record/194814/files/HEDP\\_report\\_\\_2k15\\_web-version.pdf](https://repository.gsi.de/record/194814/files/HEDP_report__2k15_web-version.pdf)

---

*Статья*

**Nonlinear response of the quantum Hall system to a strong electromagnetic radiation**

H.K. Avetissian, G. F. Mkrtchian

Physics Letters A 2016 3924-3927

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

---

*Монография*

**Relativistic Nonlinear Electrodynamics: The QED Vacuum and Matter in Super-Strong Radiation Fields**

H.K. Avetissian

2016 506

---

*Статья*

**Microscopic nonlinear relativistic quantum theory of absorption of powerful x-ray radiation in plasma**

H. K. Avetissian, A. G. Ghazaryan, H. H. Matevosyan, G. F. Mkrtchian

Physical Review E 2015 043103/8

<https://journals.aps.org/pre/>

---

*Статья*

**Multiphoton interaction of a qutrit with single-mode quantized field in the ultrastrong and deep strong coupling regimes**

H.K. Avetissian, A.K. Avetissian, G. F. Mkrtchian, O.V. Kibis

Journal of Nanophotonics 2015 093064/14

<https://spie.org/publications/journals/journal-of-nanophotonics>

---

*Статья*

**Gamma-ray laser based on the collective decay of positronium atoms in a Bose-Einstein condensate**

H.K. Avetissian, A.K. Avetissian, G. F. Mkrtchian

Physical Review A 2015 023820/10

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

---

*Статья*

**Multiphoton dynamics of qutrits in the ultrastrong coupling regime with a quantized photonic field**

H.K. Avetissian, A. K. Avetissian, G.F. Mkrtchian, O.V. Kibis

Journal of Experimental and Theoretical Physics 2015 925-933

<http://link.springer.com/journal/11447>

---

*Статья*

**Production of high energy-solid density electron bunches and hard  $\gamma$ -quanta and positron fluxes by ultrarelativistic lasers in solid-plasma targets**

H.K. Avetissian, H. H. Matevosyan, G. F. Mkrtchian, Kh. V. Sedrakian

Physical Review Special Topics-Accelerators and Beams 2015 121301/7

<http://journals.aps.org/prab/about>

---

*Статья*

**Multiphoton Excitations and Harmonics Generation in Quantum Electrodynamical Vacuum**

Avetissian H.K., Avetissian A.K., Avchyan B.R., Mkrtchian G.F.

News and Reports from High Energy Density generated by Heavy Ion and Laser Beams 2015 2015 62

[https://repository.gsi.de/record/194814/files/HEDP\\_report\\_\\_2k15\\_web-version.pdf](https://repository.gsi.de/record/194814/files/HEDP_report__2k15_web-version.pdf)

---

*Статья*

**Intense Coherent Gamma-Ray Source Based on the Collective Radiation of Positronium Atoms in a Bose-Einstein Condensate**

Avetissian H.K., Avetissian A.K., Mkrtchian G.F.

News and Reports from High Energy Density generated by Heavy Ion and Laser Beams 2015 2015 61

[https://repository.gsi.de/record/194814/files/HEDP\\_report\\_\\_2k15\\_web-version.pdf](https://repository.gsi.de/record/194814/files/HEDP_report__2k15_web-version.pdf)

---

*Конференция*

**X-ray Absorption via Electron-ion SB in Maxwellian Plasma at the Exact Consideration of Coulomb Potential**

H.K. Avetissian, A.K. Avetissian, A.G. Ghazaryan, G.F. Mkrtchian

---

*Конференция*

**Landau-quantized graphene in strong radiation field and high harmonic generation**

H.K. Avetissian, A.G. Ghazaryan, G.F. Mkrtchian, Kh.V. Sedrakian

---

*Конференция*

**High Energy-Density Positrons and Gamma-Quanta Fluxes from Nanotargets under Laser Beams of Ultrarelativistic Intensities**

H.K. Avetissian

---

*Конференция*

**Influence of excitonic effects on high harmonic generation by strong laser field in gated graphene**

H.K. Avetissian, G.F. Mkrtchian

---

*Конференция*

**Nonlinear response of graphene quantum Hall system to a strong laser radiation**

H.K. Avetissian, G.F. Mkrtchian

---

*Конференция*

**Role of Coulomb Forces and Radiation Friction in Laser Production of High Density Electron Beams from Solid-Plazma-Targets**

H.K. Avetissian, S. S. Israelyan, G. F. Mkrtchian, Kh. V. Sedrakian

---

*Конференция*

**High harmonics generation with 2D metallic carriers of topological insulators**

H. K. Avetissian, A. K. Avetissian, B. R. Avchyan, G. F. Mkrtchian

---

*Конференция*

**High harmonic generation at particle-hole multiphoton excitation in gapped bilayer graphene**

H. Avetissian, A. Avetissian, A. Ghazaryan, G. Mkrtchian, Kh. Sedrakian

---

*Конференция*

**High Harmonic Generation in (3+1)-dimensional Weyl Semimetals**

Hamlet Avetissian Karo, Vagharshak Avetisyan Narek, Babken Avchyan Ruben, Garnik Mkrtchian Felix

---

*Конференция*

**Disorder-Induced Effects in High-Harmonic Generation Process in Fullerene Molecules**

H. K. Avetissian, S. Sukiasyan, H. H. Matevosyan, G. F. Mkrtchian

---