CURRICULUM VITAE OF Ashot Chilingarian

SURNAME Chilingarian **FIRST NAME(S)** Ashot

Official address:

Yerevan Physics Institute.
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Nationality: Armenian **Date and place of birth:** May 18, 1949,
Yerevan, Republic of Armenia

Education (*degrees, dates, universities)*

BS from Physics Dept. of Yerevan State University 1966-1971,

Ph.D. 1984, from Yerevan Physics Institute (YerPhI),

Doctor of Science (Physics and Mathematics), 1991, from YerPhI

Career/Employment (*employers, positions and dates)*

Researcher, senior Researcher, data analysis group leader at the Yerevan Physics Institute, 1971--1993,

Head of the Cosmic Ray Division 1993-- till today,
Director of Yerevan Physics Institute 2008—2017,
Professor of Physics in Yerevan State University 1975-2016;
Professor of Physics in the National Research Nuclear University MEPhI (Moscow Engineering Physics Institute) – 2014-till now
Project manager in Space Research institute of RAS – 2017-2019

Specialization (*specify),*

(i) High-energy astrophysics, Solar physics, Geophysics; Lightning Physics
(ii) New Methods for Multivariate Data Analysis, Particle Detectors, Neural network and Bayesian statistical models
(iii) Most recent research interests include: modulation of the secondary cosmic ray fluxes, space weather, solar-terrestrial connections, high energy phenomena in the

atmosphere

Courses taught at the Department of Applied Mathematics and Physics of the Yerevan State University and National Research Nuclear University MEPhI (Moscow Engineering Physics Institute).

High-Energy Physics in Atmosphere;
Introduction to High Energy Astrophysics;
Cosmic Rays,
Modeling of Physical Processes,
Multivariate Methods of Data Analysis;
Bayesian Methods of Statistics;
Statistical Models of Neural Networks.

Courses taught at the master program of Yerevan Physics Institute

High-Energy experimental Physics (Experiments, Data Analysis and Physical Inference), Machine learning, Neural Networks.

Honours, Awards, Fellowships, Membership of Professional Societies

Armenia's representative to the International Space Weather initiative (ISWI).
Armenia's representative to the European COST (European cooperation in Science and Technology) action ES0803:"Developing space weather products and services in Europe".
Armenia's representative to the European COST (European cooperation in Science and Technology) action CA15211 on Atmospheric Electricity.
Founder and spokesperson of the Aragats Space Environmental Center (ASEC).
Member of American Geophysical Union (AGU)
Member of the international advisory committee of the European Cosmic Ray symposiums.
Member of the commission on cosmic rays of the Russian Academy of science.
Founder and spokesperson for the Space Environmental Viewing and Analysis Network (SEVAN).
Fellow of the American physical society (APS).
Associate editor of Space Weather & Space Climate (SWSC) journal.
The information product developed under supervision of A.Chilingarian, –
"Data Visualisation Interactive Network for the Aragats Space-environmental Center" – *DVIN for ASEC* received the World Summit on Information Society award, in Geneva, in December 2003, as the world's best project in the category of e-science.
Armenia president award in Physics: High Energy Phenomena in the Thunderstorm Atmosphere (2013).
The best reviewer of Astroparticle physics and Advances in Space Research Elsevier Journas.

Member of Scientific Advisory Committee of the EU project "Research Center of Cosmic Rays and Radiation Events in the Atmosphere, CRREAT", Czech republic.
Armenian Engineers and Scientists of Americas (AESA's) Scientist of the Year Award – 2017;
First prize of the competition of best scientific publications, Institute of Space Research, Russian Academy of science, 2017.

RESEARCH GRANTS (6 selected):

1. **ISTC A116, "The Development and Implementation of Applied Neural Information Technologies". Project manager A. Chilingarian, period 1997-1999, status – accomplished, funding party – European Union, total funds received – $250,000.**

2. **ISTC A216, "Detection of the Neutron Flux from the Solar Flares at the Aragats Cosmic Ray Observatory". Project manager A.Chilingarian, period 2001-2003, funding parties – Japan, USA, total funds promised – $280,000.**

3. **ISTC A-757, "Nonparametric methods of data analysis in Cosmic Ray Astrophysics. An applied theory of Monte Carlo statistical inference. Monograph". Project manager A. Chilingarian, period 2002-2003, funding parties USA, total funds - $30,000.**

4. **ISTC A1058 Development of a Prototype Detector System for Space Weather Monitoring and Forecasting World-Wide Network. ". Project manager A. Chilingarian, period 2004-2006, status – approved, funding parties Europe,USA, total funds - $676,000.**

5. **ISTC A1554, "Planetary Space Weather Research and Forecasting by Networks of Hybrid Particle Detectors measuring neutral and charged fluxes", Project manager A. Chilingarian, period 2008-2010, status – implementing, funding parties Europe, total funds - $967,00;**

6. **Russian Science grant № 17-12-01439, Comprehensive research of high-energy particles sources and powerful VHF radiation in electrically active atmosphere based on ground-based measurements and satellite observations, Project manager A. Chilingarian, period 2017-2019, status – implementing, funding parties Russia, total funds - 18 Million Rubles**

7. **Armenian government grant for advanced research, "Natural radioactivity and cosmic rays", period 2021-2025, total funds – 150 mln AMD.**
8. **DESY grant, Installing SEVAN spectrometer on ZugSpitse in Bavarian Alps, period – 2022-2023, total funds - 48,000 euro.**

- **Number of papers in refereed journals: ≈ 500**
- **Number of communications to scientific meetings: ~150**
- **Monographs and proceedings of conferences (Edited): 9**

Current Topics of Cosmic Ray Research with EAS Observations, Proc. of ANI 98 Workshop, Nor Amberd, 1998, edited by A.Chilingarian, H. Rebel, M.Roth and M.Zazyan, Forschungszentrum Karlsruhe, Internal report 6215,1998
Current Topics of Cosmic Ray Research with EAS Observations, Proc. of the Workshop ANI 99, edited by A.Chilingarian, H. Rebel, A.Haungs and Kh.Sanosyan, Forschungszentrum Karlsruhe FZK Internal report 6472, Nor-Amberd, Armenia, 2000.
Nonparametric methods of Data Analysis in Cosmic Ray Astrophysics. An Applied Theory of Monte Carlo Statistical Inference, International Science Technology Center (ISTC), A.Chilingarian,2003.
Solar Extreme Events: Fundamental Science and Applied Aspects (SEE-2005), Proc.of Int.Symp., Edited A.Chilingarian, G.Karapetyan, Nor Amberd, Armenia, Tigran Mets, 2006.
Forecasting of Radiation and Geomagnetic Storms by Networks of Particle Detectors (FORGES 2008), Proc. of Int. Symp., Edited by A.Chilingarian, Nor Amberd, Armenia, Tigran Mets, 2009.
Thunderstorms and Elementary Particle Acceleration (TEPA-2013, 2014, 2016), Proc. Int. Symposium, Edited by A.Chilingarian, Nor Amberd, TIGRAN METS, 2014, 2015,2016, 2018.

Selected Journal Publications from last 3 Years

1. A.Chilingarian , S. Soghomonyan , Y. Khanikyanc , D. Pokhsraryan , On the origin of particle fluxes from thunderclouds, *Astroparticle Physics* 105 , 54(2019).

2. A.Chilingarian, Energetic radiation from thunderclouds: extended particle fluxes directed to Earth's surface, Rendiconti Lincei. Scienze Fisiche e Naturali, doi.org/10.1007/s12210-018-0755-y, 2019.

3. A.Chilingarian, J.Knapp and M.Zazyan, Monitoring of the atmospheric electric field and cosmic-ray flux for the interpretation of results in high-energy astroparticle physics experiments, EPJ Web Conf., Volume 197, 2019, Atmospheric Monitoring for High-Energy Astroparticle Detectors (AtmoHEAD-2018), Article 03001.

4. K.Apresyan, A.Chilingaryan, A.Ghalumyan, V. Ghazaryan, Upgrade of YerPhI polarization LIDAR System for Investigation of the Influence of Static Electric Fields on the Elastic and Raman Backscattered Beams Polarization, The European Physical Journal Conferences 197(6):03005, DOI: 10.1051/epjconf/201919703005

5. K.A.Nicoll, R.G.Harriso,V.Barta et al.,A global atmospheric electricity monitoring network for climate and geophysical research, JASTP, 184, 18 (2019).

6. A.Chilingarian, H. Mkrtchyan, G. Karapetyan, et al., Catalog of 2017 Thunderstorm Ground Enhancement (TGE) events observed on Aragats, (2019) Nature Scientific Reports 9(1):6253, DOI: 10.1038/s41598-019-42786-7

7. A.Chilingarian, Reply to "Comment on 'Long lasting low energy thunderstorm ground enhancements and possible Rn-222 daughter isotopes contamination, Phys. Rev. D 99, 108102 (2019)

8. A. Chilingarian, A. Avetisyan, G. Hovsepyan, T. Karapetyan, L. Kozliner, et al., Origin of the low-energy gamma ray flux of the long-lasting thunderstorm ground enhancements, Phys. Rev. D 99, 102002 (2019).

9. A. Chilingarian, Y. Khanikyants, V. A. Rakov, and S. Soghomonyan, Termination of thunderstorm-related bursts of energetic radiation and particles by inverted-polarity intracloud and hybrid lightning discharge, Atmospheric Research 233 104713, (2020).
10. Magic collaboration, Avery-high-energy component deep in the γ-ray burst afterglow, Nature 575 , 464–467, 20 November, 2019.

11. Magic collaboration, Observation of inverse Compton emission from a long γ-ray burst, Nature 575 , 459–463, 20 November, 2019.

12. A.Chilingarian, G. Hovsepyan, A. Elbekian, T. Karapetyan, L. Kozliner, H. Martoian, and B. Sargsyan, Origin of enhanced gamma radiation in thunderclouds, Physical review research, 1, 033167 (2019)

13. A. Chilingarian, G. Hovsepyan, E. Svechnikova, E. Mareev, Comment on "Measurement of the electrical properties of a thundercloud through muon imaging by the GRAPES-3 experiment'', PRL, 124, 019501 (2020)

14. Chilingarian, A. A. (2020), Understanding high-energy physics in Earth's atmosphere, EOS, 101, https://doi.org/10.1029/2020EO138276. 08 January 2020.

15. A. Chilingarian ,G. Hovsepyan, T. Karapetyan, G. Karapetyan, L. Kozliner, H. Mkrtchyan, D. Aslanyan,and B. Sargsyan, Structure of thunderstorm ground enhancements, PRD 101, 122004 (2020).

16. A.Chilingarian, M. Dolgonosov, A. Kiselyov,Y. Khanikyants and S. Soghomonyan, Lightning observations using broadband VHF interferometer and electric field measurements, 2020 *JINST* 15 P07002
17. Chilingarian, A., Hovsepyan, G., & Sargsyan, B. (2020). Circulation of Radon progeny in the terrestrial atmosphere during thunderstorms. *Geophysical Research Letters*, *47*, e2020GL091155. https://doi. org/10.1029/2020GL091155.
18. Hunting, E. R., Matthews, J., de Arróyabe Hernáez, P. F., England, S. J., Kourtidis, K., Koh, K., et al. (2020). Challenges in coupling atmos- pheric electricity with biological systems. *International Journal of Biometeorology*. https://doi.org/10.1007/s00484-020-01960-7
19. A.Chilingarian, G. Hovsepyan, G.Karapetyan, and M.Zazyan, Stopping muon effect and estimation of intracloud electric field, Astroparticle Physics 124 (2021) 102505.
20. A.Chilingarian, T.Karapetyan, M.Zazyan, G.Hovsepyan, Balabek Sargsyan,Nina Nikolova, Hristo Angelov, Jaroslav Chum, and Rony Langer, Maximum strength of the atmospheric electric field, PRD, 2021, 103, 043021 (2021).
21. A.Chilingarian, High Energy Physics in the Earth's Atmosphere, Природа 3, 11, 2021.
22. A. Chilingarian, D. Aslanyan, B. Sargsyan , On the origin of particle flux enhancements during winter months at Aragats, Physics Letters A 399 (2021) 127296
23. Svechnikova E.K., Ilin N.V., Mareev E.A., A.Chilingarian, Characteristic features of the clouds producing thunderstorm ground enhancements, JGR Atmosphere, 2021, 126, e2019JD030895, doi:10.1029/2019JD030895.
24. A. Chilingarian, G. Hovsepyan, E. Svechnikova, and M. Zazyan, Electrical structure of the thundercloud and operation of the electron accelerator inside it, Astroparticle Physics 132 (2021) 102615 https://doi.org/10.1016/j.astropartphys.2021.102615.
25. A.Chilingarian, G. Hovsepyan, and M. Zazyan, Measurement of TGE particle energy spectra: An insight in the cloud charge structure, Europhysics letters (2021), 134 (2021) 6901, https://doi.org/10.1209/0295-5075/ac0dfa
26. Ashot Chilingarian, The progress of High-Energy Physics in Atmosphere achieved with the implementation of particle physics and nuclear spectroscopy methods, 2021, 37th International Cosmic Ray Conference, DOI: 10.22323/1.395.0366
27. Chilingarian, A., Hovsepyan, G., & Zazyan, M. (2021). Muon tomography of charged structures in the atmospheric electric field. *Geophysical Research Letters*, *48*, e2021GL094594. https://doi.org/10.1029/2021GL094594
28. A. Chilingarian, G. Hovsepyan, T.Karapetyan, B.Sarsyan, and S.Chilingaryan Measurements of energy spectra of relativistic electrons and gamma-rays avalanches developed in the thunderous atmosphere with

Aragats Solar Neutron Telescope, Journal of Instrumentation, 17 P03002 (2022).
29. A. Chilingarian, G. Hovsepyan, The synergy of the cosmic ray and high energy atmospheric physics: Particle bursts observed by arrays of particle detectors, New Astronomy, 97 (2022) 101871
30. A. Chilingarian, G. Hovsepyan, T. Karapetyan, Y. Khanykyanc, D. Pokhsraryan, B. Sargsyan, S. Chilingaryan and S. Soghomonyan, Multi-messenger observations of thunderstorm-related bursts of cosmic rays, 2022 *JINST* 17 P07022[4]
31. A.Chilingarian, G.Hovsepyan, T.Karapetyan, B.Sargsyan, and M.Zazyan, Development of the relativistic runaway avalanches in the lower atmosphere above mountain altitudes, EPL, 2022, DOI: https://doi.org/10.1209/0295-5075/ac8763
32. A.Chilingarian, A.; Hovsepyan, G.; Karapetyan, T.; Sargsyan, B.; Svechnikova, E. Transient Luminous Events in the Lower Part of the Atmosphere Originated in the Peripheral Regions of a Thunderstorm. Universe 2022, 8, 412. https://doi.org/10.3390/ universe8080412