Curriculum Vitae

Hamlet G. Mkrtchyan
Experimental Physics Devision, A.I. Alikhanyan National Science Laboratory
(Yerevan Physics Institute)
+(374)55-04-04-47, mkrtchyan@yerphi.am, hamlet@jlab.org

Education

2019 **Professor** (*Diploma*: Professor in Physics), A.I. Alikhanyan National Science Laboratory, Yerevan, Armenia, 2019

2008 **Doctor in Physics** (Diploma: "Study structure of hadrons and quark-hadron duality with electrons up to 6 GeV energies"), Yerevan Physics Institute, Yerevan, Armenia, 2008

1973 **PhD in Physics** (*Diploma Thesis*: "Investigation of the Pion Electromagnetic Form-Factor from the inverse electro-production reaction"), JINR, Dubna Moscow region, RF, 1973

1959 – 1964 Yerevan State University Faculty of Physics, Nuclear and High Energy Physics. **Master's degree**, YSU, Yerevan, Armenia, 1964

1948 – 1959 N67 School after Egishe Charents. Yerevan, Armenia, 1959

Research Experience

2021-present

Assembling PbWO4 calorimeter for Hall C Nutral Particle Spectrometer (NPS). R&D studies, design and construction prototypes of EEEmCal calorimeter for the Electron-Ion-Collider ePIC project. CC members of EIC user group. Participation in JLab Hall C Pion-LT, Pt-SIDIS, R-SIDIS and CSV experiments and on-line and off-line data analysis. Members of NICA SPD Collaboration, leader of AANL group. Co-spokesperson of Pt-SIDIS, R-SIDIS and π^0-SIDIS experiments.

2016-2020

Investigation optical properties (transmission), light yields and radiation hardness of PbWO crystals. Design and construction PbWO4 calorimeter for Hall C Nutral Particle Spectrometer (NPS). Participation in R&D studies and design of EEEmCal calorimeter for the Electron-Ion-Collider ATHENA project. Continued participation in JLab Hall C experiments (after 2020 remote) and data analysis.

2009-2015

Participation in JLab Hall C experiments. Analysis of pt-SIDIS experimental data. Design, construction and assembling Preshower and Shower detectors for SHMS. In collaboration with CUA (T. Horn) design and construction Aerogel Cherenkov detectors for SHMS spectrometer. With R. Ent and P. Bosted

proposed experiment E12-09-017 (Pt-SIDIS). In collaboration with R. Ent and P. Bosted proposed experiment E12-06-104 ($R=\sigma_L/\sigma_T$ in SIDIS).

1997-2008

In collaboration with R. Ent and P. Bosted did studies of transverse momentum dependence of the cross section in Semi-Inclusive Pion Production (the analysis of E00-108 data). Was member of JLab Hall C Steering Committee. With my supervision YerPhI group developed and assembled Aerogel detector for HMS .

1990-1996

Work in collaboration E91-016 (B. Zeidman spokesperson) on Electroproduction of Kaons and Light Hypernuclei. Work in collaboration E93-018 (O. Baker spokesperson) Electroproduction of K+ mesons. With my supervision YerPhI group developed, assembled PbO calorimeters for HMS & SOS spectrometers.

1974-1989

Work on the design and construction magnetic spectrometer "Electron" at YerPhI, and extraction of 4 GeV electron beam. Participation in experiment "pi0 photo-production from 4 He", developed technique for detection of recoil nuclei. Work on electron quasi-elastic scattering experiments at YerPhI with H. Vartapetyan.

1964-1973

Work with laboratory Leonid Nemenov at LNP JINRIHEP on design and construction of experimental apparatus for "Invers electroproduction of Pions", and in IHEP (Protvino) accelerator for "Detection and Investigation of Di-mesoatoms". Paricipation in these experiments and data analysis.

Professional Preparation

2020-present	Continuing work on assembling of NPS calorimeter in collaboration with JLab, CUA and IJCLab-Orsay. Work on the R&D studies of electromagnetic calorimeter for the EIC. Assembling and tests of EmCal prototypes for ePIC detector of EIC.
2015-2020	Work on SIDIS-π^o program and construction of NPS calorimeter in collaboration with JLAB. Work on the R&D studies of electromagnetic calorimeter for the EIC. Participated in Hall C Kaon-LT and Pion-LT experiments.
2010-2015	Work on the design and construction electromagnetic calorimeters and Aerogel Cherenkov detectors for the JLab Hall C SHMS spectrometer. Participated in development Hall C experimental program at CEBAF 12 GeV energy. Proposed (with R. Ent, T. Horn and P. Bosted) SIDIS experiments E12-06-104 (Ratio R=sigL/sigT), E12-09-017 (pt-SIDIS) and E12-13-007 (pi0-IDIS). Participation in Hall C experimental data taking and analysis.

1990-2010	Work on the design and construction electromagnetic calorimeters and Aerogel Cherenkov detectors for the JLab Hall C SOS and HMS spectrometers. Proposed and lead first SIDIS experiment "Duality in charged meson electro-production" at Jlab 6 GeV energies. Participation in Hall C experiments and data analysis with Rolf Ent, Peter Bosted.
1974-1990	Work on photo and electro-production reaction project at Yerevan electron accelerator ARUS. Investigation exclusive photoproduction of π^0 mesons from 4He target. Design and construction of experimental apparatus, data taking and analysis. Work was condacted in collaboration with T. Asatiani, M. Xachaturyan, A. Aleksanyan
1964-1974	Work on LNP (JINR, Dubna) Pion inverse electro-production project. Design and construction experimental apparatus, data taking and analysis of $\pi^- + p \rightarrow e^+ + e^- + n$ reaction at 275 MeV beam energy. Work with L. Nemenov, A. Kuptsov, A. Kulikov, D. Khazins.
1964 – present	Yerevan Physics institute (currently known as AANL: A.I. Alikhanian National Science Laboratory), started as Staff scientist.

Selected Publications

1. T. Navasardyan et al. The Onset of Quark-Hadron Duality in Pion Electroproduction. Phys. Rev. Lett. 98(2007)022001.
2. H. Mkrtchyan et al. Transverse momentum dependence of semi-inclusive pion production. Phys. Lett. B65, 20-25 (2008).
3. R. Asaturyan et al., Semi-inclusive charged-pion electroproduction off protons and deuterons: Cross sections, ratios and access to the quark-parton model at low energies, Phys. Rev. C85, 015202 (2012).
4. H. Mkrtchyan et al., The lead-glass electromagnetic calorimeters for the magnetic spectrometers in Hall C at Jefferson Lab., Nucl. Instr. Methods, A719, pp.85-100, 2013.
5. T. Horn, H. Mkrtchyan et al., The Aerogel Cerenkov detector for the SHMS magnetic spectrometer in Hall C at Jefferson Lab, Nucl. Instr. Methods, A842, pp.28-47, 2017.
6. A.J.R. Puckett, E. Brash, &&, H. Mkrtchyan et al., Polarization transfer observables in elastic electron-proton scattering at Q2=2.5, 5.2, 6.8 and 8.5 GeV2, Phys.Rev. C96, 055203, 2017
7. S. Basnet, GM. Huber, &&, H. Mkrtchyan et al., Exclusive $\pi+$ electroproduction of the proton from low to high –t, Phys. Rev. C100, 065204, 2019
8. T. Horn, V.V. Berdnikov, &&, H. Mkrtchyan et al., Scintillating crystals for the Neutral Particle Spectrometer in Hall C at JLab, Nucl. Instr. Methods, A936, pp.163375, 2020.

9. A. Asaturyan, F. Barbosa, &&, H. Mkrtchyan et al., Electromagnetic calorimeters based on scintillating lead tungstate crystals for experiments at Jefferson Lab, Nucl. Instr. Methods, A1013, pp.165683, 2021.
10. A. Androic, DS. Armstrong, &&, H. Mkrtchyan et al., Measurement of the beam-normal single-spin asymmetry for elastic electron scattering from 12C and 27 Al, Phys.Rev. C 104, 014606,2021
11. R Li, Nikos Sparveris, Hamza Atac, MK Jones, Michael Paolone, &&, H. Mkrtchyan et al., Measured proton electromagnetic structure deviates from theoretical predictions, Nature 611 (7935), 265-270, 2022
12. R Abdul Khalek, A Accardi, J Adam, D Adamiak, W Akers, &&, H. Mkrtchyan et al., Science requirements and detector concepts for the electron-ion collider: EIC yellow report, Nucl. Instr. Methods, A1047, pp.167859, 2023.
13. A. Karki, D. Biswas, F.A. Gonzales, W. Henry, C. Morean, &&, H. Mkrtchyan et al., (Hall C Collaboration), First Measurement of the EMC effect in 10B and 11 B, Phys. Rev. C108 (2023)035201
14. P. Achenbach, D. Adhikari, A. Afanasev, F. Afzal, C.A. Aidala, &&, H. Mkrtchyan et al., The present and future of QCD, Nucl. Instr. Methods, A1047, pp.122874, 2024.
15. J.K. Adkins, Y. Akiba, A. Albataineh, M. Amaryan, I.C. Arsene, &&, H. Mkrtchyan et al., Design of the ECCE detector for the Electron Ion Collider Nucl. Instr. Methods, A1073, pp.170240, 2025.

Language Skills

English (fluent), Russian(fluent), Armenian(native)

Hardware Skills

Cherenkov detectors, experience with high energy experimental physics technique (phototubes, crystals, scintillators, aerogels, Photo-tubes, HV dividers, Light emitted diodes, fast and spectrometric electronics).

Specialized Skills

Nuclear and elementary particle physics, high energy elementary particle detection and identification methods, design and construction of electromagnetic calorimeters and Cherenkov radiation detectors, neutron detectors, LED and Laser light based detector calibration and monitoring systems. Crystals radiation damage and annealing methods.

References:

Dr. Thia Keppel, Director of Jefferson Lab Physics division, Keppel@jlab.org
Dr. Tanja, Horn. CUA group leader; hornt@jlab.org
Dr. Mark Jones, Jefferson Lab Hall A/C leader, jones@jlab.org

Statistics (07 April 2025):

	All	Since 2020
Citatations	11489	4272
h-index	53	31
i10-index	115	88