Scrisoare de motivaţie
aferentă candidaturii pentru calitatea de membru al consiliului departamentului

Mă numesc Victor Eugen Ambruş şi sunt în prezent lector al Facultăţii de Fizică a UVT. M-am alăturat colectivului facultăţii în toamna anului 2015, după finalizarea studiilor de doctorat la Universitatea din Sheffield (Marea Britanie) şi după un stagiu postdoctoral la Filiala Timişoara a Academiei Române.

Îmi depun dosarul pentru un loc în consiliul departamentului pentru a putea contribui direct la administrarea formei şi conţinutului programelor de studii pe care le ofertăm actualilor şi viitorilor noştri studenţi. Consider că prin continua adaptare atât a planului de învăţământ, prin includerea unor discipline de actualitate, cât şi a fişelor disciplinelor, prin alinierea lor la ultimele trenduri europene şi mondiale, ne putem spori atractivitatea în rândul absolvenţilor de liceu şi ai ciclurilor de licenţă, care sunt pasionaţi de fizică.

În decursul carierei, am acumulat o experienţă didactică şi ştiinţifică diversă, în urma stagiilor făcute în diferite părţi ale lumii (doctorat în Marea Britanie; stagiu Fulbright în SUA; stagiu Humboldt în Germania). Pot spune că am văzut „sistemul" din interior, atât la noi, cât şi în afara ţării, formându-mi o viziune universală de bune practici bazate pe inclusivitate, transparenţă, performanţă şi seriozitate.

Ca membru al consiliului de departament, voi lupta pentru menţinerea standardelor ridicate ale actului didactic, atât în ceea ce priveşte programa analitică cât şi în privinţa promovării tinerilor valoroşi şi performanţi.

12.10.2023

Lect. [redacted]r E. Ambruş

DECLARATIE

Subsemnatul, Victor Eugen Ambruș, lector la Facultatea de Fizică a Universității de Vest din Timișoara, cunoscând prevederile art.326 din Codul penal cu privire la falsul în declarații declar pe proprie răspundere că nu am fost lucrător sau colaborator al securității.

12.10.2023 Le[redacted] E. Ambruș

Curriculum vitae — Victor E. Ambruș

Contact Information

Department of Physics,
West University of Timișoara,
Bd. Vasile Pârvan 4, RO-300223 Timișoara

+40 256 592 108

victor.ambrus@e-uvt.ro

Research Interests

- **Lattice Boltzmann modelling** and applications in rarefied gas flows.
- **Relativistic kinetic theory** and applications in quark-gluon plasma.
- **Quantum field theory** at finite temperature.

Educational background (degrees and where and when they were granted)

University of Sheffield, UK

Ph.D., Quantum field theory on curved spaces, October 2010–December 2014 (awarded on 17th December 2014)

- Thesis title: *Dirac fermions on rotating space-times*
- Supervisor: Prof. Elizabeth Winstanley (E.Winstanley@sheffield.ac.uk)
- Funded through a Graduate Teaching Assistantship (covering tuition & maintenance), awarded by the University of Sheffield.

West University of Timișoara, Romania

M.Sc., Quantum fields and elementary processes, October 2008–July 2010

- Thesis title: *Particle production in a Robertson-Walker space with a de Sitter phase of finite extension*
- Supervisor: Dr. Nistor Nicolaevici (nicolaevici@physics.uvt.ro)

B.Sc., Theoretical physics, October 2005–July 2008

- Thesis title: *The Lattice Boltzmann method and its application in fluid dynamics*
- Supervisor: Dr. Victor Sofonea (sofonea@acad-tim.tm.edu.ro)

B.Sc., Computer science, October 2005–September 2008

- Thesis title: *Parallel computing techniques on grid architectures*
- Supervisor: Prof. Dana Petcu (petcu@info.uvt.ro)

Professional experience (positions held)

Lecturer — Since September 2015
Department of Physics
West University of Timișoara, Romania
Courses taught: Physics of Fluids, Stellar Astrophysics.
Coordinator of the Mesoscopic systems (G4) research group.

Humboldt Postdoctoral Researcher — June 2020–May 2022
Institute for theoretical Physics, Goethe University, Frankfurt am Main, DE
Project title: *Relaxation-time approximation in quark-gluon plasma modelling*
Project hosts: Prof. Dr. Carsten Greiner, Prof. Dr. Dirk Rischke

Fulbright Visiting Scholar — February – July 2019
Old Dominion University, Norfolk, VA, USA
Project title: *Analytical and Numerical Techniques for Knudsen Layer Analysis in Rarefied Channel Flows*
Project host: Li-Shi Luo, Professor & Eminent Scholar & Richard F. Barry Endowed Chair

Research associate — May 2012–September 2016
Centre for Fundamental and Advanced Technical Research
Romanian Academy – Timișoara Branch, Romania

Research assistant — January 2007–July 2008
Department of Physics
West University of Timișoara, Romania

Teaching activities

Current courses: Stellar Astrophysics, General Physics, Complements of Physics, Quantum field theory.
Previous courses: Physics of Fluids, Chemical and physical properties of crystals.

Honors, Awards and Grants

- UEFISCDI Young Research Teams grant, 2022 competition
  Project title: Kinetic models for the quark-gluon plasma (2022-2024)
  Host institution: West University of Timișoara
- The ICMMES-Sugon Award for Young Scientists
  Awarded at the International Conference for Mesoscopic Methods in Engineering and Science in 2021 for the work titled *Multicomponent flows on curved geometries.*
- UEFISCDI (Romanian Ministry) Postdoctoral research grant, 2016 competition
  Project title: Quantum corrections in mesoscopic systems (2018-2020)
  Host institution: West University of Timișoara
- Ad-astra association 2018 prize for scientific results in Physical and Chemical Sciences (under 7 years since PhD degree award, Romanian-based affiliation).
- "Constantin Miculescu" prize from the Romanian Academy of Science (2017 ed.), awarded for the group of papers on *Study of mesoscopic systems undergoing rotation* (half share).
- Eminent researcher prize, awarded by the Academic Horizons Society, Timișoara, Romania (2017).
- UEFISCDI (Romanian Ministry) Young Research teams grant, 2014 competition
  Project title: *Lattice Boltzmann models for the simulation of flows of rarefied gases in the relativistic regime* (2015-2017)
  Host institution: West University of Timișoara

Citations and H-index

- ResearcherID: E-6324-2016
  Articles With Citation Data: 49
  Sum of the Times Cited: 482
  H-index: 12
- ORCID: 0000-0003-2685-3338
  Documents by author (Scopus): 51
  Sum of the Times Cited (Scopus): 487
  H-index (Scopus): 13
- Note: the above data was collected on 12th October 2023.

Publications in ISI journals

1. V. E. Ambruș, S. Schlichting, C. Werthmann
   Opacity dependence of transverse flow, preequilibrium, and applicability of hydrodynamics in heavy-ion collisions
   Phys. Rev. D **107** (2023) 094013.

2. V. E. Ambruș, S. Schlichting, C. Werthmann
   Establishing the range of applicability of hydrodynamics in high-energy collisions
   Phys. Rev. Lett. **130** (2023) 152301.

3. V. E. Ambruș, M. N. Chernodub
   Hyperon–anti-hyperon polarization asymmetry in relativistic heavy-ion collisions as an interplay between chiral and helical vortical effects
   Eur. Phys. J. C **83** (2023) 111.

4. V. E. Ambruș, E. Molnár, D. H. Rischke
   Transport coefficients of second-order relativistic fluid dynamics in the relaxation-time approximation
   Phys. Rev. D **106** (2022) 076005.

5. V. E. Ambruș, L. Bazzanini, A. Gabbana, D. Simeoni, S. Succi, R. Tripiccione
   Fast kinetic simulator for relativistic matter
   Nat. Comput. Sci. **2** (2022) 641.

6. D. Wagner, A. Palermo, V. E. Ambruș
Inverse-Reynolds-dominance approach to transient fluid dynamics
Phys. Rev. D **106** (2022) 016013.

7. V. E. Ambruș, R. Ryblewski, R. Singh
Spin waves in spin hydrodynamics
Phys. Rev. D **106** (2022) 014018.

8. V. E. Ambruș, S. Schlichting, C. Werthmann
Development of transverse flow at small and large opacities in conformal kinetic theory
Phys. Rev. D **105** (2022) 014031.

9. V. E. Ambruș, M. N. Chernodub
Hyperon–anti-hyperon polarization asymmetry in relativistic heavy-ion collisions as an interplay between chiral and helical vortical effects
Eur. Phys. J. C **82** (2022) 61.

10. V. E. Ambruș, S. Busuioc, J. A. Fotakis, K. Gallmeister, C. Greiner
Bjorken flow attractors with transverse dynamics
Phys. Rev. D **104** (2021) 094022.

11. V. E. Ambruș, E. Winstanley
Vortical effects for free fermions on anti-de Sitter space-time
Symmetry **13** (2021) 2019.

12. M. Chernodub, V. E. Ambruș
Phase diagram of helically imbalanced QCD matter
Phys. Rev. D **103** (2021) 094015.

13. V. E. Ambruș, F. Sharipov, V. Sofonea
Comparison of the Shakhov and ellipsoidal models for the Boltzmann equation and DSMC for ab initio-based particle interactions
Comput. Fluids **211** (2020) 104637.

14. S. Busuioc, H. Kusumaatmaja, V. E. Ambruș
Axisymmetric flows on the torus geometry
J. Fluid Mech. **901** (2020) A9.

15. S. Busuioc, V. E. Ambruș, T. Biciușcă, V. Sofonea
Two-dimensional off-lattice Boltzmann model for van der Waals fluids with variable temperature
Comput. Math. Appl. **79** (2020) 111-140.

16. V. E. Ambruș
Helical massive fermions under rotation
J. High Energ. Phys. **2020** (2020) 16.

17. V. E. Ambruș, S. Busuioc, A. J. Wagner, F. Paillusson, H. Kusumaatmaja
Multicomponent flow on curved surfaces: A vielbein lattice Boltzmann approach
Phys. Rev. E **100** (2019) 063306.

18. S. Busuioc, V. E. Ambruș
Lattice Boltzmann models based on the vielbein formalism for the simulation of flows in curvilinear geometries
Phys. Rev. E **99** (2019) 033304.

19. G. Negro, S. Busuioc, V. E. Ambruș, G. Gonnella, A. Lamura, V. Sofonea
Comparison between isothermal collision-streaming and finite-difference lattice Boltzmann models
Int. J. Mod. Phys. C **30** (2019) 1941005.

20. V. Sofonea, T. Biciușcă, S. Busuioc, V. E. Ambruș, G. Gonnella, A. Lamura
Corner-transport-upwind lattice Boltzmann model for bubble cavitation
Phys. Rev. E **97** (2018) 023309.

21. V. E. Ambruș, V. Sofonea
Half-range lattice Boltzmann models for the simulation of Couette flow using the Shakhov collision term
Phys. Rev. E **98** (2018) 063311.

22. V. E. Ambruș, R. Blaga
High-order quadrature-based lattice Boltzmann models for the flow of ultrarelativistic rarefied gases
Phys. Rev. C **98** (2018) 035201.

23. V. E. Ambruș
Transport coefficients in ultrarelativistic kinetic theory
Phys. Rev. C **97** (2018) 024914.

24. V. E. Ambruș
Quantum non-equilibrium effects in rigidly-rotating thermal states
Phys. Lett. B **771** (2017) 151–156.

25. V. E. Ambruș, E. Winstanley
Thermal expectation values of fermions on anti-de Sitter space-time
Class. Quantum Grav. **34** (2017) 145010.

26. V. E. Ambruș, V. Sofonea
Application of mixed quadrature lattice Boltzmann models for the simulation of Poiseuille flow at non-negligible values of the Knudsen number
J. Comput. Science **17** (2016) 403–417.

27. V. E. Ambruș, V. Sofonea
Lattice Boltzmann models based on half-range Gauss-Hermite quadratures
J. Comput. Phys. **316** (2016) 760.

28. V. E. Ambruș, I. I. Cotăescu
Maxwell-Jüttner distribution for rigidly rotating flows in spherically symmetric spacetimes using the tetrad formalism
Phys. Rev. D **94** (2016) 085022.

29. V. E. Ambruș, E. Winstanley
Rotating fermions inside a cylindrical boundary
Phys. Rev. D **93** (2016) 104014.

30. P. Fede, V. Sofonea, R. Fournier, S. Blanco, O. Simonin, G. Lepoutere, V. E. Ambruș
Lattice Boltzmann model for predicting the deposition of inertial particles transported by a turbulent flow
Int. J. Multiphase Flow **76** (2015) 187.

31. V. E. Ambruș, E. Winstanley
Renormalised fermion vacuum expectation values on anti-de Sitter space-time
Phys. Lett. B **749** (2015) 597-602.

32. V. E. Ambruș, V. Sofonea
Implementation of diffuse reflection boundary conditions using lattice Boltzmann models based on Gauss-Laguerre quadratures
Phys. Rev. E **89** (2014) 041301(R).

33. B. Piaud, S. Blanco, R. Fournier, V. E. Ambruș, V. Sofonea
Gauss quadratures-The keystone of lattice Boltzmann models
Int. J. Mod. Phys. C **25** (2014) 1340016.

34. V. E. Ambruș, V. Sofonea
Lattice Boltzmann models based on Gauss quadratures
Int. J. Mod. Phys. C **25** (2014) 1441011.

35. V. E. Ambruș, E. Winstanley
Rotating quantum states
Phys. Lett. B **734** (2014) 296-301.

36. V. E. Ambruș, V. Sofonea
High-order thermal lattice Boltzmann models derived by means of Gauss quadrature in the spherical coordinate system
Phys. Rev. E **86** (2012) 016708.

ISI-INDEXED CONFERENCE PROCEEDINGS PAPERS

1. V. E. Ambruș, S. Schlichting, C. Werthmann
Development of transverse flow for small and large systems in conformal kinetic theory
Acta Phys. Pol. B Proc. Suppl. **16** (2023) 1-A32.

2. Ș. T. Kis, V. E. Ambruș
Implicit-explicit finite-difference lattice Boltzmann model with varying adiabatic index
AIP Conf. Proc. **2218** (2020) 050008.

3. V. E. Ambruș
Fermion condensation under rotation on anti-de Sitter space
Acta Phys. Pol. B Proc. Suppl. **13** (2020) 199.

4. V. E. Ambruș, F. Sharipov, V. Sofonea
Lattice Boltzmann approach to rarefied gas flows using half-range Gauss-Hermite quadratures: Comparison to DSMC results based on ab initio potentials
AIP Conf. Proc. **2132** (2019) 060012.

5. V. E. Ambruș, C. G. Guga-Roșian
Lattice Boltzmann study of the one-dimensional boost-invariant expansion with anisotropic initial conditions
AIP Conf. Proc. **2071** (2019) 020014.

6. V. E. Ambruș, E. Winstanley
Quantum Corrections in Thermal States of Fermions on Anti-de Sitter Space-time
AIP Conf. Proc. **1916** (2017) 020005.

7. V. E. Ambruș
Anderson-Witting Transport Coefficients for Flows in General Relativity
AIP Conf. Proc. **1796** (2017) 020006.

8. S. Busuioc, V. E. Ambruș, V. Sofonea
Lattice Boltzmann Simulation of Droplet Formation in T-junction Geometries
AIP Conf. Proc. **1796** (2017) 020009.

9. R. Blaga, V. E. Ambruș
Quadrature-based Lattice Boltzmann Model for Relativistic Flows
AIP Conf. Proc. **1796** (2017) 020010.

10. V. E. Ambruș, E. Winstanley
Fermions on AdS
Springer Proceedings in Physics **170** (2015) 331–336.

11. V. E. Ambruș, E. Winstanley
Massless rotating fermions inside a cylinder
AIP Conf. Proc. **1694** (2015) 020011.

12. V. E. Ambruș, E. Winstanley
Dirac fermions on an anti-de Sitter background
AIP Conf. Proc. **1634** (2014) 40.

13. V. E. Ambruș, V. Sofonea
Thermal Lattice Boltzmann models derived by Gauss quadrature using the spherical coordinate system
J. Phys.: Conf. Ser. **362**, 012043 (2012).

INVITED TALKS AT CONFERENCES

- V. E. Ambruș
Multicomponent flows on curved geometries
Invited lecture at *ICMMES 2021*
Online only, 12-16 July 2021.

- V. E. Ambruș
Simulation of rarefied gas flows using half-range quadratures
Invited lecture at *ICMMES 2019*
Heriot Watt University, Edinburgh (UK), 22-26 July 2019.

- V. E. Ambruș
Lattice Boltzmann models based on Gauss quadratures
Workshop *Lattice Boltzmann 2016*
Department of Physics, University of Rome "Tor Vergata" (Italy), 9-10 June, 2016.

- V. E. Ambruș, E. Winstanley
Fermions on anti-de Sitter space-time
TIM 2013 Physics Conference
West University of Timișoara (Romania), 21-23 November 2013.