Dr. Elena-Mirela Babalic

Contact information

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National Institute of Physics and Nuclear Engineering
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Research experience

Jan. 2020 - onwards: **Senior Researcher (CS 2),** Department of Theoretical Physics, National Institute of Physics (NIPNE), Bucharest, Romania

Oct. 2017 – Jan. 2020: **Researcher (CS 3),** Department of Theoretical Physics, National Institute of Physics (NIPNE), Bucharest, Romania

*Oct. 2015 – Oct. 2017***: Postdoctoral Researcher** at IBS – Center for Geometry and Physics, Pohang, Korea

*Dec. 2013 – Oct. 2015***: Researcher (CS 3)**, Department of Theoretical Physics, National Institute of Physics (NIPNE), Bucharest, Romania

Oct. 2010 – Dec. 2013: **Researcher (CS),** Department of Theoretical Physics, National Institute of Physics (NIPNE), Bucharest, Romania

Jun. 2009 – Sep. 2010: **Postdoctoral Research Assistant**, Department of Theoretical Physics, National Institute of Physics (NIPNE), Bucharest, Romania

Sep. 2007 – Aug. 2008: **Early Stage Researcher** in Superstring Theory (position within "The European Superstring Theory Network"), Dept. of Fundamental Physics, Chalmers University of Technology, Göteborg, Sweden. Research area: cohomological aspects in supersymmetric field theory. Supervisors: Prof. Lars Brink and Prof. Niclas Wyllard.

Education

2009: **Ph.D. in Theoretical Phyics**, University of Craiova, Romania
Thesis title: *"Symmetries, Supersymmetries and Cohomologies in Gauge Theories"*
Supervisor: Prof. Solange-Odile Saliu

2003: **M.Sc. (Theoretical High Energy Physics)**, University of Craiova, Romania
Dissertation: *"Two-dimensional tensor-vector interactions"*
Supervisor: Prof. Constantin Bizdadea

2002: **B.Sc. (Physics)**, University of Craiova, Romania

1998: Baccalaureate Diploma, Nicolae Titulescu College (Specialty: Math-Phys), Craiova

Research Grants

Oct. 2015 – Oct 2017: member of Research Grant **IBS-R003-S1** from the Korean government at IBS-CGP, Pohang, on "Constructive string field theory of open-closed topological B-type strings"

Apr. 2014 – Oct. 2015: **Principal Investigator** of strategic postdoctoral grant gained by competition, **POSDRU /159/1.5/S/133255**, Project ID **133255 (2014)**, co-financed by the European Social Fund within the Sectorial Operational Program Human Resources Development 2007-2013, in partnership with the University of Craiova, Romania

Mar. - Apr. 2014 – funding from CERN for a two weeks visit to CERN Theory Division

2011 – 2015: member of Romanian research grant CNCS **PN-II-ID-PCE**, contract no. **121/2011** (Principal investigator: Prof. Irinel Caprini)

2010 – 2013: member of Romanian research grant CNCS **PN-II-RU-TE**, contract no. **77/2010** (Principal investigator: Dr. Andrei Micu)

Jun. 2009 – Dec. 2010: member of Romanian research grant CNCS **PN-II-ID-PCE**, contract no. **464/2009**, (Principal investigator: Prof. Irinel Caprini)

Apr. - Nov. 2010: member of Romanian research grant ANCS Euratom **PC7/Capacities**, contract no. **98/2008** (Principal investigator: Prof. Pometescu Nicolae)

Sep. 2007 – Aug. 2008: member of European Research grant contract **MRTN-CT-2004-512194** – **Superstrings – REF RTD REG/T.3(2007)D/516925** (PI: Prof. Lars Brink)

Awards

2017 *Stefan Procopiu prize of the Romanian Academy* for the research activity in 2015 on 8-dimensional compactifications of 11-dimensional supergravity

2010: *Serban Titeica Prize for remarkable scientific contributions of young researchers*, awarded by Horia Hulubei National Institute of Physics and Nuclear Engineering (IFIN-HH)

Computing skills

- experienced user of operating systems Linux and Windows
- experienced user in some expert symbolic computation packages of Wolfram Mathematica
- website administrator for the website http://events.theory.nipne.ro/gap/ of the group seminar Geometry&Physics@DFT

Memberships

- I am the Romanian representative in the Executive Committee of the SEENET-MTP network (since 2023) (https://www.seenet-mtp.info/committees/council)

- I am member in the Management Committee of the COST Action CA22113 “Fundamental challenges in theoretical physics” (THEORY-CHALLENGES) (since 2024)

- I am member in the Management Committee of the COST Action CA21106 “COSMIC WISPers in the Dark Universe: Theory, astrophysics and experiments” (CosmicWISPers) (since 2023)

Co-organizer of the following scientific events

- “Bucharest 2024 Minischool” organized under the CERN-SEENET-MTP PhD Training Program (https://events.theory.nipne.ro/gap/index.php/seenet-mtp-seminar-bucharest-2024/organizers-school-2024)

- the seminar series “Trans-Carpathian Seminar on Geometry and Physics” (https://tcs.fuw.edu.pl/index.php/organisers-and-friends/) - since 2024

- “Bucharest Conference on Geometry and Physics”, September 2-6, 2019, IMAR, Bucharest, Romania (https://events.theory.nipne.ro/gap/index.php/conference)

- “Geometry and Physics seminar” within the Department of Theoretical Physics, NIPNE, Bucharest, Romania (https://events.theory.nipne.ro/gap/index.php/seminar)

- the conference “Sring Field Theory of Landau-Ginzburg models”, September 11-15, 2017, IBS Center for Geometry and Physics, Pohang, Korea (https://cgp.ibs.re.kr/activities/conferences/String%20Field%20Theory%20of%20Landau-Ginzburg%20models)

- “Bucharest PhD Training School”, in the framework of the CERN-SEENET-MTP PhD Training Program, in collaboration with IFIN-HH and University of Bucharest, 8-14 November 2015, (https://events.theory.nipne.ro/gap/index.php/bucharest-2015-phd-school/poster-2015)

Language Proficiency

Fluent written and spoken: **English** (excellent), **French** (very good), **Spanish** (good)

Publications and preprints, seminar and conference talks

https://www.nipne.ro/7358-staff_info.html

Selected publications

1. The infrared behavior of tame two-field cosmological models
   E.M. Babalic, C. I. Lazaroiu,
   Nuclear Physics B 983(2022)115929
2. Remarks on the geometry of the extended Siegel-Jacobi upper half-plane
   E.M. Babalic, Stefan Berceanu
   Romanian Journal of Physics 65, 113 (2020), 27 pag, arXiv:2002.04452
3. Hidden symmetries of two-field cosmological models
   Lilia Anguelova, Elena Mirela Babalic, Calin Iuliu Lazaroiu
   JHEP 09 (2019) 007
4. Two-field Cosmological α-attractors with Noether Symmetry
   L. Anguelova, E. M. Babalic, C. I. Lazaroiu
   JHEP 04 (2019) 148
5. Differential models for B-type open-closed topological Landau-Ginzburg theories
   E.M. Babalic, D. Doryn, C.I. Lazaroiu, M. Tavakol
   Commun. Math. Phys. (2018), 361(3), 1169-1234,
6. Generalized α-attractor models from elementary hyperbolic surfaces
   E.M. Babalic, C.I. Lazaroiu
   Adv. Math. Phys., Vol. 2018, ID 7323090, 24 pages,
7. Generalized two-field α-attractors from the hyperbolic triply-punctured sphere
   E.M. Babalic, C.I. Lazaroiu
   Nuclear Physics B 937 (2018) 434–477,
8. On B-type open-closed Landau-Ginzburg theories defined on Calabi-Yau Stein manifolds
   E.M. Babalic, D. Doryn, C.I. Lazaroiu, M. Tavakol
   Commun. Math. Phys. (2018), 362(1), 129-165,
9. Foliated backgrounds for M-theory compactifications (II)
   E.M. Babalic, C.I. Lazaroiu
   Rom. J. Phys., Volume 61, Number 1-2, 2016
10. Geometric algebra techniques in flux compactifications
    C.I. Lazaroiu, E.M. Babalic, I.A. Coman
    Advances in High Energy Physics, 7292534 (2016), 42 pages,
11. Complete integrability of geodesic motion in Sasaki-Einstein toric Y^{p,q} spaces
    E.M. Babalic, M. Visinescu
    Modern Physics Letters A, Vol. 30, No. 33, 1550180 (2015), [arXiv:1505.03976
12. Foliated eight-manifolds for M-theory compactifications
    E.M. Babalic, C.I. Lazaroiu
    JHEP 01 (2015) 140 , (60 pg)

13. Internal circle uplifts, transversality and stratified G-structures
    E. M. Babalic, C. I. Lazaroiu
    JHEP 11 (2015) 174

14. Singular foliations for M-theory compactifications
    E. M. Babalic, C. I. Lazaroiu
    JHEP 1503 (2015) 116 , (63 pg)

15. The landscape of G-structures in eight-manifold compactifications of M-theory
    E.M. Babalic, C.I. Lazaroiu
    JHEP 11 (2015) 07

16. Naturalness in low-scale SUSY models and non-linear MSSM
    I. Antoniadis, E. M. Babalic, D. M. Ghilencea
    Eur. Phys. J. C 74 (2014) 9, 3050 , (20pg)

17. Geometric algebra techniques in flux compactifications (II)
    Calin-Iuliu Lazaroiu, Elena Mirela Babalic
    JHEP 06 (2013) 054 , (48 pg)

18. Revisiting eight-manifold flux compactifications of M-theory using geometric algebra techniques, E. M. Babalic, C. I. Lazaroiu
    Rom. Journ. Phys 58, Nos. 5-6, (2013) 414–422

19. The geometric algebra of Fierz identities in arbitrary dimensions and signaturesC.-I. Lazaroiu, E.-M. Babalic, I.-A. Coman
    JHEP 09 (2013)156 , (74 pg)

20. Dual linearized gravity in D=6 coupled to a purely spin-two field of mixed symmetry (2,2)
    C. Bizdadea, E. M. Cioroianu, S. O. Saliu, and E. M. Babalic
    Fortschr. Phys. 58, No. 4 - 5, 341 - 363 (2010)

21. CD Correlation functions and the shape of K_l3 form factors
    I. Caprini and E.-M. Babalic
    Rom. Journ. Phys, 55, (2010) 920-930

22. Yes-go cross-couplings in collections of tensor fields with mixed symmetries of the type (3,1) and (2,2)
    C. Bizdadea, E. M. Cioroianu, S. O. Saliu, and E. M. Babalic
    Int. J. Mod. Phys. A25 (2010) 1211-1238

23. Towards relating the kappa-symmetric and pure spinor versions of the supermembrane
    Mirela Babalic, Niclas Wyllard
    JHEP 0810 (2008) 059-073