

## Dr. Elena-Mirela Babalic

### Contact information

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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 Physics**, 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

## *Scientific Memberships and Activities*

- The Romanian representative in the Executive Committee of the SEENET-MTP network (since 2023)
- Member in the Management Committee of the COST Action CA21106 “COSMIC WISPerS in the Dark Universe: Theory, astrophysics and experiments” (CosmicWISPerS) (since 2023)
- Organizer of the “Bucharest Conference on Geometry and Physics”, September 2-6, 2019, IMAR, Bucharest, Romania (<https://events.theory.nipne.ro/gap/index.php/conference>)
- Organizer of the “Geometry and Physics seminar” within the Department of Theoretical Physics, NIPNE, Bucharest, Romania (<https://events.theory.nipne.ro/gap/index.php/seminar>)
- Organizer of the conference “String 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>)
- Member in the organization team of the “Bucharest PhD Training School”, under the CERN-SEENET-MTP PhD Training Program, in collaboration with IFIN-HH and University of Bucharest, 8-14 Nov. 2015, <http://events.theory.nipne.ro/hepSchool-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](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  $\alpha$ -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  $\alpha$ -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  $\alpha$ -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 signatures  
C.-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. Cioioianu, S. O. Saliu, and E. M. Babalic  
Fortschr. Phys. 58, No. 4 - 5, 341 - 363 (2010)
21. QCD 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. Cioioianu, 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