

Research papers

Refereed

- 2024 B.M.A.G. Piette and Á. L., *Bi-symmetric polyhedral cages with maximally connected faces and small holes*, submitted for publication
- 2023 D. Ciurla, P. Forgács, Á. L., and T. Romańczukiewicz, *Negative radiation pressure in Bose-Einstein condensates*, *Phys. Rev.* **E 109**, 014228, [arXiv:2307.02925](#) [nlin.PS]
- 2023 B.M.A.G. Piette and Á. L., *Near-miss bi-homogenous symmetric polyhedral cages*, *Symmetry* **2023**, 15, 1804, Repositories: Optimisation using simulated annealing, Data
- 2023 B.M.A.G. Piette and Á. L., *Near-miss symmetric polyhedral cages*, *Symmetry* **2023**, 15, 717, Code: Optimisation using simulated annealing, Symmetry groups and labelling, Data
- 2022 J. Erdmanis, Á. L., Yu.V. Nazarov, *Drastic effect of weak interaction near special points in semiclassical multiterminal superconducting nanostructures*, *Phys. Rev.* **B 106**, 125422, [arXiv:2107.14105](#) [cond-mat.mes-hall]
- 2022 R. Trényi, Á. L., P. Horodecki, R. Horodecki, T. Vértesi, and G. Tóth, *Multicopy metrology with many-particle quantum states*, *New Journal of Physics* **26**, 023034, [arXiv:2203.05538](#) [quant-ph]
- 2022 Á. L., R. Trényi, T. Vértesi, and G. Tóth, *Optimizing local Hamiltonians for the best metrological performance*, [arXiv:2206.02820](#) [quant-ph]
- 2021 P. Forgács and Á. L., *Charge screening in the Abelian Higgs model*, *Eur. Phys. J.* **C 81**, 243, [arXiv:2011.01634](#) [hep-th]
- 2020 P. Forgács and Á. L., *On non-topological solitons in Abelian gauge theories coupled to $U(1) \times U(1)$ symmetric scalar fields*, *Phys. Rev.* **D 102**, 076017, [arXiv:2008.09844](#) [hep-th]
- 2020 P. Forgács and Á. L., *Electroweak strings with dark scalar condensates and their stability*, *Phys. Rev.* **D 102**, 023009, [arXiv:1909.07447](#) [hep-ph]
- 2018 J. Erdmanis, Á. L., and Y.V. Nazarov, *Weyl discs: theoretical prediction*, *Phys. Rev.* **B 98**, 241105(R) (2018), [arXiv:1805.03678](#) [cond-mat.mes-hall]
- 2017 P. Forgács and Á. L., *Stabilisation of semilocal strings by dark scalar scalar condensates*, *Phys. Rev.* **D 95**, 035003, [arXiv:1612.03151](#) [hep-th]
- 2016 P. Forgács and Á. L., *Vortices and magnetic bags in Abelian models with extended scalar sectors and some of their applications*, *Phys. Rev.* **D 94**, 125018, [arXiv:1608.00021](#) [hep-th]
- 2016 P. Forgács and Á. L., *Vortices with scalar condensates in two-component Ginzburg-Landau systems*, *Phys. Lett.*, **B 762**, 271-275, [arXiv:1603.03291](#) [hep-th]

- 2016 **Á. L.**, “Half a proton” in the BPS Skyrme model, *J. Math. Phys.*, **57**, 072903, [arXiv:1603.01305 \[hep-th\]](#)
- 2016 T. Ioannidou and **Á. L.**, Time-Dependent BPS Skyrmions, *J. Math. Phys.*, **57**, 022901, [arXiv:1601.03048 \[hep-th\]](#)
- 2015 P. Forgács, **Á. L.**, and F.A. Schaposnik, Non-Abelian Vortices with a Twist, *Phys. Rev. D* **91**, 125001, [arXiv:1504.05129 \[hep-ph\]](#)
- 2013 P. Kovács, **Á. L.**, J. Váróczy, Gy. Wolf, and M. Zétényi, Baryon octet and decuplet phenomenology in a three-flavor extended linear sigma model, *Phys. Rev. D* **89**, 054004, [arXiv:1311.5991 \[hep-ph\]](#)
- 2013 P. Forgács, **Á. L.**, and T. Romańczukiewicz, Plane waves as tractor beams, *Phys. Rev. D* **88**, 125007, [arXiv:1303.3237 \[hep-th\]](#)
- 2009 P. Forgács and **Á. L.**, Instabilities of twisted strings, *JHEP* **12** (2009) 064, [arXiv:0908.2621 \[hep-th\]](#)
- 2008 Gy. Fodor, P. Forgács, Z. Horváth, and **Á. L.**, Small amplitude quasi-breathers and oscillons, *Phys. Rev. D* **78**, 025003, [arXiv:0802.3525 \[hep-th\]](#)
- 2008 P. Forgács, **Á. L.**, and T. Romańczukiewicz, Negative radiation pressure exerted on kinks, *Phys. Rev. D* **77**, 125012, [arXiv:0802.0080 \[hep-th\]](#)
- 2005 V. Czimmer, M. Vasúth, and **Á. L.**, An analytic approach to the late ISW effect in a Λ dominated universe, *Int. J. Mod. Phys. A* **20** 7233-7240, [arXiv:astro-ph/0503347](#)
- 2005 V. Czimmer, M. Vasúth, **Á. L.**, and Z. Perjés, Covariant linear perturbations in a concordance model, *Int. J. Mod. Phys. A* **20** 5671-5677, [arXiv:gr-qc/0501009](#)

Proceedings

- 2021 P. Forgács and **Á. L.**, Some recent results on Q-balls and screening in the Abelian Higgs model, In: Yu.L. Dokshitzer, P. Lévai, **Á. L.**, and J. Nyiri (eds.), *Gribov-90 Memorial Volume: Field Theory, Symmetry, and Related Topics*, Proceedings of the Memorial Workshop Devoted to the 90th Birthday of V.N. Gribov, World Scientific, Singapore.
- 2016 P. Forgács, **Á. L.**, and F.A. Schaposnik, Twisted non-Abelian vortices, In: Yu.L. Dokshitzer, P. Lévai, and J. Nyiri (eds.), *Gribov-85 Memorial Volume: Exploring Quantum Field Theory*, Proceedings of the Memorial Workshop Devoted to the 85th Birthday of V.N. Gribov, World Scientific, Singapore, *Int. J. Mod. Phys. A* **31**, 1645046.
- 2013 **Á. L.**, Twisted Strings in Extended Abelian Higgs Model, In: A. Zichichi (ed.), *What is Known and Unexpected at LHC*, Proceedings of the International School of Subnuclear Physics, Erice-Sicily, Italy, 29 August – 7 September 2010, World Scientific, Singapore.
- 2010 G. Fodor, P. Forgács, Z. Horváth, and **Á. L.**, Almost periodic localized states: oscillons and oscillatons, In: N. Carlevaro, R. Ruffini, and G.V. Vereshchagin (eds.), *Proceedings of the 3rd Stueckelberg Workshop on Relativistic Field Theories*, Cambridge Science Publishers, Cambridge, UK.
- 2005 Z. Perjés and **Á. L.**, Canonical quantization and black hole perturbations, In: Jerzy Lukierski and Dmitri Sorokin (eds.), *Fundamental Interactions and twistor-like methods - XIXth Max Born Symposium*, *AIP Conf. Proc.* **767**, 306, [arXiv:gr-qc/0503108](#).

Theses

- 2010 Localised solutions and their perturbations in field theory, ELTE Eötvös Loránd University, Budapest, supervisor: Prof. Péter Forgács, degree: PhD (Physics)

- 2007 *Perturbations of solitons*, ELTE Eötvös Loránd University, Budapest, supervisors: Prof. Péter Forgács and Prof. Gisbert Stoyan, degree: MSc (Mathematics)
- 2004 *Canonical quantum gravity*, ELTE Eötvös Loránd University, Budapest, supervisor: Prof. Zoltán Perjés, degree: MSc (Physics)

Conference talks, seminars

- 2022 *Stability analysis of electroweak-dark strings*, Geometric models of nuclear matter, Kent, Canterbury, UK
- 2022 *Q-balls: something old, something new, with components one and two (invited talk)*, Solitons, (non-)Integrability, Geometry, Kraków, Poland
- 2021 *Non-topological solitons in Abelian gauge theories coupled to $U(1) \times U(1)$ symmetric scalar fields*, ACHT 2021, online
- 2020 *Q-balls in a $U(1)$ gauge theory coupled to $U(1) \times U(1)$ symmetric scalars*, Solitons at Work Seminar, online
- 2020 *The stability of electroweak-dark strings*, Theoretical Physics Seminar, UPV/EHU, Leioa, Spain
- 2019 *Weyl discs*, Department of Quantum Nanoscience, TU Delft, The Netherlands
- 2019 *Preserving numerical algorithms*, FOSDEM 2019, Brussels, Belgium
- 2018 *Weyl discs*, seminar of the Dept. Theor. Phys., Technical University, Budapest, Hungary
- 2018 *Weyl discs*, Wigner Inst. Solid State Physics seminar, Budapest, Hungary
- 2017 *Stabilisation of semilocal strings by dark scalar condensates (invited talk)*, Solitons: Integrability, Duality and Applications, Sao Paulo, Brazil
- 2016 *Semilocal-dark strings*, ACHT 2016, Čakovec, Croatia
- 2015 *Plane waves as tractor beams*, Seminar talk at the Department of Theoretical Physics, University of Szeged, Hungary
- 2015 *Some properties of BPS skyrmions*, ACHT 2015, Leibnitz, Austria
- 2015 *Twisted non-Abelian vortices*, Solitons: Topology, Geometry, and Applications, Thessaloniki, Greece
- 2015 *Twisted non-Abelian vortices*, Progress in Fluid/Gravity Correspondence, Thessaloniki, Greece
- 2014 *Plane waves as tractor beams*, International School of Subnuclear Physics, Erice, Sicily
- 2014 *Plane waves as tractor beams*, 78. DPG-Frühjahrestagung, Berlin, Germany
- 2013 *Are tractor beams possible?*, Seminar talk at the Department of Pure Mathematics, University of Leeds, UK
- 2013 *Are tractor beams possible?*, Seminar talk at the Roland Eötvös University, Budapest, Hungary (Particle Physics seminar)
- 2013 *Are tractor beams possible?*, Seminar talk at the Wigner RCP, Budapest, Hungary
- 2012 *Negative Radiation Pressure: Simple Models*, Non-Perturbative Methods in Quantum Field Theory, 5th Spring Workshop in Theoretical Particle Physics, 11-13 April 2012, Szombathely, Hungary
- 2012 *Cosmic strings*, Seminar talk at the Konkoly Thege Miklós Astronomical Observatory, Budapest, Hungary

- 2011 *The force acting on the Aharonov–Bohm solenoid*, Mathematical Physics day in honour of the 70th birthday of Tamás Matolcsi, Budapest, Hungary
- 2011 *Vortex-radiation interaction: comparison of second and first order dynamics*, Strong Interactions in Quantum Field Theory, Austria-Croatia-Hungary Triangle Workshop, Fürstenfeld, 4 May, Austria
- 2011 *Vortex–radiation interaction in ϕ^4 and GP theories*, International School of Subnuclear Physics, Erice, Sicily
- 2010 *Twisted vortices without $SU(2)$* , International School of Subnuclear Physics, Erice, Sicily
- 2010 *Vortex–radiation interaction in ϕ^4 theory*, Seminar talk at the Roland Eötvös University, Budapest, Hungary
- 2009 *Twisted vortices without $SU(2)$* , Quantum Fields and Quark Matter, 4th Austrian–Croatian–Hungarian Meeting, Rab, Croatia
- 2009 *Vortex–radiation interaction in the ϕ^4 theory*, Strong interactions in QFT, Austria–Croatia–Hungary Triangle Workshop, Fürstenfeld, Austria
- 2008 *Examination of the stability of twisted vortices’ at Eötvös Loránd University*, Seminar talk at the Roland Eötvös University, Budapest, Hungary (Particle Physics seminar)
- 2007 *Can the radiation pressure exerted on a kink be negative?*, Seminar talk at the Roland Eötvös University, Budapest, Hungary (Particle Physics seminar)
- 2007 *Negative radiation pressure in nonlinear field theories*, Seminar talk at the RMKI Research Institute for Particle and Nuclear Physics, Budapest, Hungary
- 2006 *Quasinormal modes*, Presentation at the Summer school ‘Measurements and Einstein’s Gravitation Theory’, Gyöngyöstarján, Hungary

Conference posters

- 2018 *Weyl discs*, Physics Veldhoven, Veldhoven, The Netherlands
- 2016 *Some properties of BPS Skyrmions*, International School of Subnuclear Physics, Erice, Sicily
- 2015 *Non-Abelian vortices with a twist*, International School of Subnuclear Physics, Erice, Sicily
- 2013 *Tractor beams, cosmic strings, and related phenomena*, Wigner 111, Budapest, Hungary
- 2013 *Tractor beams, cosmic strings, and related phenomena*, International School of Subnuclear Physics, Erice, Sicily
- 2013 *Motion of vortices in first and second order ϕ^4 theory*, Equations of Motion 2013, Bad Honnef, Germany
- 2010 *String solutions in two component Abelian Higgs models*, Geometry and Physics, Cracow, Poland

Popular science articles

- 2019 **Á. L.**, *Symmetries in physics and their mathematics*, De Physicus **30**/4, p.22
- 2006 **Á. L.**, *Evaporating black holes in the laboratory*, Tétékás Nyúz XXXIII./9-10., p.17 (Weekly newspaper of the students of Eötvös Loránd University, in Hungarian)

Edited volumes

- 2021 Yu.L. Dokshitzer, P. Lévai, **Á. L.**, and J. Nyiri, *Gribov-90 Memorial Volume: Field Theory, Symmetry, and Related Topics*, Proceedings of the Memorial Workshop Devoted to the 90th Birthday of V.N. Gribov, World Scientific, Singapore.