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"Supersymmetry Breaking with Fields, Strings and Branes"

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"Supersymmetry Breaking with Fields, Strings and Branes"

"We are proposing a combination of closely related activities aimed at widening the catalogue of available non-supersymmetric string vacua and at clarifying their stability properties, with an eye to some general constraints on gravitational interactions that have been proposed lately … The novelty here is that we would like to investigate whether and how supersymmetric methods, which are in some respects a counterpart, in Quantum Field Theory, of the complex variables of Analysis, can help to address the puzzles … of broken Supersymmetry. Concretely, the methods of "Fake Supergravity" have a real potential of leading to new solutions and more powerful stability arguments …"

1. *Effective field theories for broken Supersymmetry in String Theory (gauging in supergravity, stability of vacua, non-linear realizations, black holes, cosmological solutions,…)*
2. *Holographic methods and dualities for non-supersymmetric field theories (stability of AdS solutions, generalized microstate counting, non-supersymmetric dualities, localization, integrability, …)*

"Supersymmetry Breaking with Fields, Strings and Branes"

- 4 nodes:

1. Milano Bicocca (A. Tomasiello, A. Zaffaroni (c))
2. Milano INFN (A. Amariti (c) [+D. Fioravanti (INFN – Bo)])
3. Padova (G. Dall'Agata (c))
4. Scuola Normale (A. Sagnotti (c) [+ C. Angleantonj (U. Torino)])

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"Four Post-Doctoral Fellowships, to be advertised via international channels, will be attributed to young and yet relatively experienced foreign scientists, on the basis of excellence criteria …"

- **Potdocs:**

1. Milano Bicocca : S. Giri (from Uppsala)
2. Milano INFN : A. Pasternak (from Stanford)
3. Padova : Alejandro Ruiperez (from UAM – Madrid)
4. Scuola Normale : Y. Tatsuta (from DESY)

"Supersymmetry Breaking with Fields, Strings and Branes"

"Three "Joint Seminars" every year (collections of three technical seminars by world-class specialists delivered at one of our Institutes within one day that all Units would attend) …."

"An International Conference, to be held at Scuola Normale during the third year"

- KICKOFF MEETING – SNS (October 18-19, 2019)

Joint Seminars [24 speakers]:

- First Joint Seminar of the Academic Year 2019-20 (Milano Bicocca)
  1. J. Bena (Saclay) : "Black hole microstate geometries, antibranes and the dS landscape"
  2. P. Pani (U. Roma "La Sapienza") : "Testing the nature of dark compact objects"
  3. R. Rattazzi (EPFL – Lausanne) : "Multilegs, superfluids and semiclassics"

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Joint Seminars & Meetings:

- First Joint Seminar of the Academic Year 2020-21 [November 19, 2020, Zoom]
  - E. Palti (Ben Gurion U.) "Supersymmetric Protection and the Swampland"
- Second Joint Seminar of the Academic Year 2020-21 [December 17, 2020, Zoom]
  1. S. Giri (U. Milano Bicocca) "Bubbling out of the Swampland"
  2. Y. Tatsuta (Scuola Normale) "Tachyon Condensation in Magnetic Compactifications"
- Third Joint Seminar of the Academic Year 2020-21 [January 28, 2021, Zoom]
  - K. Skenderis (U. Southampton) "Conformal Field Theory in Momentum Space"
- Fourth Joint Seminar of the Academic Year 2020-21 [February 18, 2021, Zoom]
  - R. Emparan (U. Barcelona) "Quantum BTZ Black Hole"
- Fifth Joint Seminar of the Academic Year 2020-21 [March 18, 2021, Zoom]
  - G. Dvali (LMU, Munich) "S-Matrix Constraints on de Sitter and on Black Holes, and Consequences"
- Sixth Joint Seminar of the Academic Year 2020-21 [May 20, 2021, Zoom]
  - T. Weigand (U. Hamburg) "Emergent Strings in Quantum Gravity"

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Joint Seminars & Meetings

- First Joint Seminar of the Academic Year 2021-22 [October 28, 2021, Zoom]
  1. A. Rupierez (U. Padova) : "$(\alpha')^2$ corrections to the Kerr Black Hole"
  2. J. Nian (INFN-Milano) : "Logarithmic Corrections to AdS Black Hole and Black String Entropies"
- Second Joint Seminar of the Academic Year 2021-22 [November 18, 2021, Zoom]
  E. Bergshoeff (U. Gronigen) "Recent Advances in Non-Relativistic (Quantum) Gravity"
- Third Joint Seminar of the Academic Year 2021-22 [December 16, 2021, Zoom]
  M. Peloso (U. Padova) "Slow and safe gravitinos"
- Fourth Joint Seminar of the Academic Year 2021-22 [January 20, 2022, Zoom]
  O. Aharony (Weizmann Institute) "Toward an Explicit Theory of Quantum Gravity"
- Fifth Joint Seminar of the Academic Year 2021-22 [February 17, 2022, Zoom]
  D. Lust (LMU andMax Planck Institute) "Large and Small Non-extremal Black Holes, Thermodynamics Dualities and the Swampland"
- Sixth Joint Seminar of the Academic Year 2021-22 [March 17, 2022, Zoom]
  I. Antoniadis (LPTHE, Paris and Nordita, Stockholm) "Challenges of an Accelerating Universe in String Theory"

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Joint Seminars & Meetings

- First Joint Seminar of the Academic Year 2022-23 [October 13, 2022, Zoom]
  A. Uranga (UAM, Madrid) "Dinamical Cobordism and the End of the World"
- Second Joint Seminar of the Academic Year 2022-23 [November 10, 2022, Zoom]
  D. Anninos (King's College, London)"Finite Features in Holography"
- Third Joint Seminar of the Academic Year 2022-23 [December 15, 2022, Zoom]
  L. Iliesiu (Stanford U.) "On the Quantum Mechanics of Near-Extremal Black Holes"
- Fourth Joint Seminar of the Academic Year 2022-23 [January 26, 2023, Zoom]
  F. Benini (SISSA) "Superconformal Index and Gravitational Path Integral"
- Fifth Joint Seminar of the Academic Year 2022-23 [February 16, 2023, Zoom]
  I. Garcia-Etxebarria (U. Durham) "Symmetry TFT's from String Theory"
- Sixth Joint Seminar of the Academic Year 2022-23 [March 23, 2023, Zoom]
  A. Sen (ICTS - Bangalore) "D-Instanton Amplitudes in String Theory"
- Seventh Joint Seminar of the Academic Year 2022-23 [April 20, 2023, Zoom]
  C. Vafa (Harvard U.) "String Theory and our Universe"

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Publications (110 in Inspire-HEP)

1. J. Mourad and A. Sagnotti, ``Non-Supersymmetric Vacua and Self-Adjoint Extensions,''[arXiv:2305.09587 [hep-th]].
2. G. Dall'Agata, N. Liatsos, R. Noris and M. Trigiante, ``Gauged D=4 N=4 Supergravity,''[arXiv:2305.04015 [hep-th]].
3. F. Farakos, M. Morittu and G. Tringas, ``On/off scale separation,''[arXiv:2304.14372 [hep-th]].
4. S. Raucci, ``Fake supersymmetry with tadpole potentials,''[arXiv:2304.12717 [hep-th]].
5. A. Amariti, N. Petri and A. Segati, ``T[1,1] truncation on the spindle,''[arXiv:2304.03663 [hep-th]].
6. C. Angelantonj, I. Florakis and G. Leone, ``Tachyons and Misaligned Supersymmetry in Closed String Vacua,''[arXiv:2301.13702 [hep-th]].
7. M. Fazzi, S. Giacomelli and S. Giri, ``Hierarchies of RG flows in 6d (1, 0) massive E-strings,''JHEP 03 (2023), 089[arXiv:2212.14027 [hep-th]].
8. H. Imai, M. Sakamoto, M. Takeuchi and Y. Tatsuta, ``Index and winding numbers on T2/ZN orbifolds with magnetic flux,''Nucl. Phys. B990 (2023) [arXiv:2211.15541 [hep-th]].
9. F. Farakos and M. Morittu, ``Goldstino condensation at large N,''Eur. Phys. J. C83 (2023) no.2, 166[arXiv:2211.12527 [hep-th]].
10. T. Kobayashi, H. Otsuka, M. Sakamoto, M. Takeuchi, Y. Tatsuta and H. Uchida, ``Zero-mode wave functions by localized gauge fluxes,''[arXiv:2211.04596 [hep-th]].
11. T. Kobayashi, H. Otsuka, M. Sakamoto, M. Takeuchi, Y. Tatsuta and H. Uchida, ``Index theorem on magnetized blow-up manifold of T2/ZN,''Phys. Rev. D107 (2023) no.7, 075032 [arXiv:2211.04595 [hep-th]].

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Publications (110 in Inspire-HEP)

12. A. Amariti and S. Rota, ``Symplectic gauge group on the Lens Space,''[arXiv:2210.12240 [hep-th]].S. Klemm and L. Ravera, ``On SIR-type epidemiological models and population heterogeneity effects,''[arXiv:2210.11342 [q-bio.PE]].
13. A. Amariti and A. Segati, ``Kerr-Newman black holes from $N=1*,''[arXiv:2210.03015 [hep-th]].
14. P. A. Cano, T. Ort\'\i{}n, A. Ruip\'erez and M. Zatti, ``Non-extremal, \ensuremath{\alpha}'-corrected black holes in 5-dimensional heterotic superstring theory,''JHEP \textbf{12} (2022), 150 [arXiv:2210.01861 [hep-th]].
15. B. Assel, Y. Tachikawa and A. Tomasiello, ``On N = 4 supersymmetry enhancements in three dimensions,''JHEP 03 (2023), 170 [arXiv:2209.13984 [hep-th]].
16. A. Amariti and D. Morgante, ``Chiral dualities for SQCD_3 with D-type superpotential,''JHEP 02 (2023), 032 [arXiv:2209.12673 [hep-th]].
17. S. M. Hosseini and A. Zaffaroni, ``The large N limit of topologically twisted indices: a direct approach,''JHEP 12 (2022), 025 [arXiv:2209.09274 [hep-th]].
18. S. Raucci, ``On new vacua of non-supersymmetric strings,''Phys. Lett. B837 (2023) [arXiv:2209.06537 [hep-th]].
19. D. Fioravanti, D. Gregori and H. Shu, ``Integrability, susy SU(2) matter gauge theories and black holes,''[arXiv:2208.14031 [hep-th]].
20. M. Fazzi and S. Giri, ``Hierarchy of RG flows in 6d (1, 0) orbi-instantons,''JHEP 12 (2022), [arXiv:2208.11703 [hep-th]].
21. D. Cassani, A. Ruip\'erez and E. Turetta, ``Corrections to AdS_5 black hole thermodynamics from higher-derivative supergravity,''JHEP 11 (2022), 059 [arXiv:2208.01007 [hep-th]].
22. P. A. Cano, B. Ganchev, D. R. Mayerson and A. Ruip\'erez, ``Black hole multipoles in higher-derivative gravity,''JHEP 12 (2022), 120 [arXiv:2208.01044 [gr-qc]].

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Publications (110 in Inspire-HEP)

23. S. Raucci, ``On codimension-one vacua and string theory,''Nucl. Phys. B985 (2022), 116002 [arXiv:2206.06399 [hep-th]].
24. J. Mourad and A. Sagnotti, ``A 4D IIB flux vacuum and supersymmetry breaking. Part I. Fermionic spectrum,''JHEP 08 (2022), 301 [arXiv:2206.03340 [hep-th]].
25. M. Astorino, R. Martelli and A. Vigan\`o, ``Black holes in a swirling universe,''Phys. Rev. D 106 (2022) no.6, 064014 [arXiv:2205.13548 [gr-qc]].
26. A. Amariti and S. Rota, ``Webs of 3d N = 2 dualities with D-type superpotentials,''JHEP 01 (2023), 124 [arXiv:2204.06961 [hep-th]].
27. G. Dall'Agata, M. Emelin, F. Farakos and M. Morittu, ``Anti-brane uplift instability from goldstino condensation,''JHEP 08 (2022), 005 [arXiv:2203.12636 [hep-th]].
28. N. Cribiori and G. Dall'Agata, ``Weak gravity versus scale separation,''JHEP 06 (2022), 006 [arXiv:2203.05559 [hep-th]].
29. C. Angelantonj, I. Antoniadis, I. Florakis and H. Jiang, ``Refined topological amplitudes from the \ensuremath{\Omega}-background in string theory,''JHEP 05 (2022), 143 [arXiv:2202.13205 [hep-th]].
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31. L. Coccia and C. F. Uhlemann, ``Mapping out the internal space in AdS/BCFT with Wilson loops,''JHEP 03 (2022), 127 [arXiv:2112.14648 [hep-th]].
32. E. Beratto, N. Mekareeya and M. Sacchi, ``Zero-form and one-form symmetries of the ABJ and related theories,''JHEP 04 (2022), 126 [arXiv:2112.09531 [hep-th]].
33. S. Giri, ``Black holes with spindles at the horizon,''JHEP 06 (2022), 145 [arXiv:2112.04431 [hep-th]].

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34. B. Ganchev, S. Giusto, A. Houppe and R. Russo, ``AdS_3 holography for non-BPS geometries,''Eur. Phys. J. C 82 (2022) no.3, 217 [arXiv:2112.03287 [hep-th]].
35. P. A. Cano, T. Ort\'i{}n, A. Ruip\'erez and M. Zatti, ``Non-supersymmetric black holes with alpha' corrections,''JHEP 03 (2022), 103 [arXiv:2111.15579 [hep-th]].
36. P. A. Cano and A. Ruip\'erez, ``String gravity in D=4,''Phys. Rev. D105 (2022) no.4, 044022 [arXiv:2111.04750 [hep-th]].
37. C. Hwang, S. Pasquetti and M. Sacchi, ``Rethinking mirror symmetry as a local duality on fields,''Phys. Rev. D106 (2022) no.10, 105014 [arXiv:2110.11362 [hep-th]].
38. U. Danielsson and S. Giri, ``Reexamining the stability of rotating horizonless black shells mimicking Kerr black holes,''Phys. Rev. D104 (2021) no.12, 124086 [arXiv:2110.10542 [hep-th]].
39. L. E. Bottini, C. Hwang, S. Pasquetti and M. Sacchi, ``4d S-duality wall and SL(2, Z) relations,''JHEP 03 (2022), 035 [arXiv:2110.08001 [hep-th]].
40. E. Colombo, ``The large-N limit of 4d superconformal indices for general BPS charges,''JHEP 12 (2022), 013 [arXiv:2110.01911 [hep-th]].
41. N. T. Macpherson and A. Tomasiello, ``N = (1, 1) supersymmetric AdS_3 in 10 dimensions,''JHEP 03 (2022), 112 [arXiv:2110.01627 [hep-th]].
42. J. Mourad and A. Sagnotti, ``On warped string vacuum profiles and cosmologies. Part II. Non-supersymmetric strings,''JHEP 12 (2021), 138 [arXiv:2109.12328 [hep-th]].
43. G. B. De Luca, N. De Ponti, A. Mondino and A. Tomasiello, ``Cheeger bounds on spin-two fields,''JHEP 12 (2021), 217 [arXiv:2109.11560 [hep-th]].
44. J. Mourad and A. Sagnotti, ``On warped string vacuum profiles and cosmologies. Part I. Supersymmetric strings,''JHEP 12 (2021), 137 [arXiv:2109.06852 [hep-th]].
45. G. Dall'Agata, M. Emelin, F. Farakos and M. Morittu, ``The unbearable lightness of charged gravitini,''JHEP 10 (2021), 076 [arXiv:2108.04254 [hep-th]].
46. D. Fioravanti, H. Poghosyan and R. Poghossian, ``A Young diagram expansion of the hexagonal Wilson loop (amplitude) in N = 4 SYM,''JHEP 10 (2021), 154 [arXiv:2107.13017 [hep-th]].

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48. D. Fioravanti and M. Rossi, ``On the origin of the correspondence between classical and quantum integrable theories,''Phys. Lett. B838 (2023), 137706 [arXiv:2106.07600 [hep-th]].
49. M. Astorino and A. Viganò, ``Many accelerating distorted black holes,''Eur. Phys. J. C81 (2021) no.10, 891 [arXiv:2106.02058 [gr-qc]].
50. N. Ceplak, S. Giusto, M. R. R. Hughes and R. Russo, ``Holographic correlators with multi-particle states,''JHEP 09 (2021), 204 [arXiv:2105.04670 [hep-th]].
51. M. Astorino and A. Viganò, ``Charged and rotating multi-black holes in an external gravitational field,''Eur. Phys. J. C82 (2022) no.9, 829 [arXiv:2105.02894 [gr-qc]].
52. F. Faedo, S. Klemm and A. Vigan\`o, ``Supersymmetric black holes with spiky horizons,''JHEP 09 (2021), 102 [arXiv:2105.02902 [hep-th]].
53. M. Sacchi, O. Sela and G. Zafrir, ``Compactifying 5d superconformal field theories to 3d,''JHEP 09 (2021), 149 [arXiv:2105.01497 [hep-th]].
54. M. Astorino and A. Vigano, ``Binary black hole system at equilibrium,''Phys. Lett. B820 (2021), 136506 [arXiv:2104.07686 [gr-qc]].
55. Y. Tatsuta, ``Modular symmetry and zeros in magnetic compactifications,''JHEP 10 (2021), 054 [arXiv:2104.03855 [hep-th]].
56. A. Amariti, M. Fazzi and A. Segati, ``Expanding on the Cardy-like limit of the SCI of 4d N = 1 ABCD SCFTs,''JHEP 07 (2021), 141 [arXiv:2103.15853 [hep-th]].
57. C. Hwang, S. S. Razamat, E. Sabag and M. Sacchi, ``Rank Q E-string on spheres with flux,''SciPost Phys. 11 (2021) no.2, 044 [arXiv:2103.09149 [hep-th]].
58. P. Pelliconi and A. Sagnotti, ``Integrable Models and Supersymmetry Breaking,''Nucl. Phys. B965 (2021), 115363 [arXiv:2102.06184 [hep-th]].
59. G. Dall'agata, G. Inverso and D. Partipilo, ``Old and new vacua of 5D maximal supergravity,''JHEP 04 (2021), 039 [arXiv:2101.04149 [hep-th]].

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61. S. Giacomelli, N. Mekareeya and M. Sacchi, ``New aspects of Argyres--Douglas theories and their dimensional reduction,"JHEP 03 (2021), 242 [arXiv:2012.12852 [hep-th]].
62. F. Belgiorno, S. L. Cacciatori, S. Trevisan and A. Vigano, ``Quantization and soliton-like solutions for the Phi \Psi-model in an optic fiber,"Eur. Phys. J. C 81 (2021) no.4, 294[arXiv:2012.05203 [hep-th]].
63. L. Coccia and C. F. Uhlemann, ``On the planar limit of 3d T_rho^sigma SU(N),"JHEP 06 (2021), 038 [arXiv:2011.10050 [hep-th]].
64. N. Cribiori, G. Dall'agata and F. Farakos, ``Weak gravity versus de Sitter,"JHEP 04 (2021), 046 [arXiv:2011.06597 [hep-th]].
65. S. M. Hosseini and A. Zaffaroni, ``Universal AdS Black Holes in Theories with 16 Supercharges and Their Microstates," Phys. Rev. Lett. 126 (2021) no.17, 171604 [arXiv:2011.01249 [hep-th]].
66. M. Sakamoto, M. Takeuchi and Y. Tatsuta, ``Index theorem on T^2/Z_N orbifolds,"Phys. Rev. D103 (2021) no.2, 025009 [arXiv:2010.14214 [hep-th]].
67. E. Hatefi and A. Kuntz, ``On perturbation theory and critical exponents for self-similar systems,"Eur. Phys. J. C81 (2021) no.1, 15[erratum: Eur. Phys. J. C82 (2022) no.2, 137] [arXiv:2010.11603 [hep-th]].
68. W. Buchmuller, E. Dudas and Y. Tatsuta, ``Tachyon condensation in magnetic compactifications,"JHEP 03 (2021), 070 [arXiv:2010.10891 [hep-th]].
69. C. Hwang, S. Pasquetti and M. Sacchi, ``Flips, dualities and symmetry enhancements,"JHEP 05 (2021), 094 [arXiv:2010.10446 [hep-th]].
70. K. Zatrimaylov, ``On Filaments, Prolate Halos and Rotation Curves,"JCAP 04 (2021), 056 [arXiv:2010.06573 [astro-ph.GA]].
71. S. Klemm and L. Ravera, ``Schrödinger connection with selfdual nonmetricity vector in 2+1 dimensions,"Phys. Lett. B817 (2021), 136291 [arXiv:2008.12740 [hep-th]].
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73. E. Beratto, S. Giacomelli, N. Mekareeya and M. Sacchi, ``3d mirrors of the circle reduction of twisted A_2N theories of class S,"JHEP 09 (2020), 161 [arXiv:2007.05019 [hep-th]].
74. A. Amariti and M. Fazzi, ``Dualities for three-dimensional N = 2 SU(N_c) chiral adjoint SQCD,"JHEP 11 (2020), 030 [arXiv:2007.01323 [hep-th]].
75. S. Klemm and L. Ravera, ``An action principle for the Einstein-Weyl equations,"J. Geom. Phys. 158 (2020), 103958 [arXiv:2006.15890 [hep-th]].
76. S. M. Hosseini, K. Hristov, Y. Tachikawa and A. Zaffaroni, ``Anomalies, Black strings and the charged Cardy formula,"JHEP 09 (2020), 167 [arXiv:2006.08629 [hep-th]].
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78. T. Basile, E. Joung, K. Mkrtchyan and M. Mojaza, ``Dual Pair Correspondence in Physics: Oscillator Realizations and Representations,"JHEP \textbf{09} (2020), 020doi:10.1007/JHEP09(2020)020[arXiv:2006.07102 [hep-th]].
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80. S. Giusto, R. Russo, A. Tyukov and C. Wen, ``The CFT_6 origin of all tree-level 4-point correlators in AdS_3 x S^3,"Eur. Phys. J. C 80 (2020) no.8, 736 [arXiv:2005.08560 [hep-th]].
81. M. Grigoriev, K. Mkrtchyan and E. Skvortsov, ``Matter-free higher spin gravities in 3D: Partially-massless fields and general structure,"Phys. Rev. D 102 (2020) no.6, 066003 [arXiv:2005.05931 [hep-th]].
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83. M. Sacchi, ``New 2d N = (0, 2) dualities from four dimensions, "JHEP \textbf{12} (2020), 009 [arXiv:2004.13672 [hep-th]].
84. D. Fioravanti, M. Rossi and H. Shu, ``QQ-system and non-linear integral equations for scattering amplitudes at strong coupling,"JHEP 12 (2020), 086 [arXiv:2004.10722 [hep-th]].
85. K. Zatrimaylov, ``A Critique of Covariant Emergent Gravity,"JCAP 08 (2020), 024[arXiv:2003.10410 [gr-qc]].

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Publications (110 in Inspire-HEP)

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87. F. Belgiorno, S. L. Cacciatori and A. Vigan\`o, ``Analog Hawking effect: A master equation,''Phys. Rev. D102 (2020) no.10, 105003 [arXiv:2003.04236 [gr-qc]].
88. F. Belgiorno, S. L. Cacciatori, A. Farahat and A. Viganò, ``Analog Hawking effect: BEC and surface waves,''Phys. Rev. D102 (2020) no.10, 105004 [arXiv:2003.04242 [gr-qc]].
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91. G. Dall'Agata and M. Morittu, ``Covariant formulation of BPS black holes and the scalar weak gravity conjecture,''JHEP 03 (2020), 192 [arXiv:2001.10542 [hep-th]].
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93. C. Angelantonj, H. Partouche and G. Pradisi, ``Heterotic -type I dual pairs, rigid branes and broken SUSY,''Nucl. Phys. B954 (2020), 114976 [arXiv:1912.12062 [hep-th]].
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97. R. Antonelli and E. Hatefi, ``On self-similar axion-dilaton configurations,''JHEP 03 (2020), 074[erratum: JHEP 02 (2022), 195; erratum: JHEP 10 (2020), 105] [arXiv:1912.00078 [hep-th]].
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Thank You