

# **Publications of Peter Rowlands**

## Books

*Oliver Lodge and the Liverpool Physical Society*, Liverpool University Press, 1990. *Newton and the Concept of Mass-Energy*, Liverpool University Press, 1990.

- The Fundamental Parameters of Physics: An Approach towards a Unified Theory, PD Publications, Liverpool, 1991.
- Waves Versus Corpuscles: The Revolution That Never Was, PD Publications, Liverpool, 1992.
- A Revolution Too Far: The Establishment of General Relativity, PD Publications, Liverpool, 1994.
- Oliver Lodge and the Invention of Radio, PD Publications, Liverpool, 1994, editor with J. Patrick Wilson, and author of: 'Preface' (with JPW), 'Radiowaves', 39-66, 'Radio begins in 1894', 75-114, 'Waves from the Sun', 125-136, 'The Significance of the aether', 137-144.
- 120 Years of Excellence, The Physics Department at The University of Liverpool 1881-2001, U-P L Communications, Liverpool, 2001.
- Herbert Fröhlich: A Physicist Ahead of His Time, editor, with G. J. Hyland, University of Liverpool, 2006, second edition, 2008.
- *War and Peace: The Life and Work of Sir Joseph Rotblat*, editor, with T. V. Attwood, and author of 'Introduction', pp 5-20 (with TVA), and 'Sir Joseph Rotblat as Teacher and Research Director', pp 75-86, University of Liverpool, 2006.
- 125 Years of Excellence, The Physics Department at The University of Liverpool 1881-2006, PD Publications, Liverpool, 2006.
- Zero to Infinity: The Foundations of Physics, World Scientific, Singapore, 2007.
- The Foundations of Physical Law, World Scientific, Singapore, 2014
- How Schrödinger's Cat Escaped the Box, World Scientific, Singapore, 2015
- *Newton and Modern Physics*, World Scientific, Singapore, London and Hackensack, NJ, 28 2017
- Newton and the Great World System, World Scientific, Singapore, London and Hackensack, NJ, 2017
- Newton Innovation and Controversy, World Scientific, Singapore, London and Hackensack, NJ, 2017

### Proceedings

- Physical Interpretations of Relativity Theory, Proceedings of International Scientific Meeting, Moscow 2005, editor, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov.
- Proceedings of the XVIII Workshop on Hadronic Mechanics, Karlstad, Sweden, 2005, editor, with Valeri Dvoeglazov, Tepper L. Gill, Erik Trell, and Horst E. Wilhelm, International Academic Publishers, December 2006.
- Physical Interpretations of Relativity Theory, Proceedings of XIII International Scientific Meeting, Moscow, 2-5 July 2007, Moscow 2007, editor, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov.
- Physical Interpretations of Relativity Theory, Proceedings of XV International Scientific Meeting PIRT, Moscow, July 2009, editor, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov
- Search for Fundamental Theory, The VIIth International Symposium Honoring French Mathematical Physicist Jean-Pierre Vigier, AIP Conference Proceedings, 1316, 2010, editor, with R. L. Amoroso and S. Jeffers
- Physical Interpretations of Relativity Theory, Proceedings of International Scientific Meeting PIRT-2006, London, 8-11 September 2006, Bauman Moscow State Technical University, 2011, editor, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov
- Physical Interpretations of Relativity Theory, Proceedings of XV International Scientific Meeting PIRT, Moscow, July 2011, Bauman Moscow State Technical University, 2012, editor, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov
- *The Physics of Reality Space, Time, Matter, Cosmos*, editor, with R. L. Amoroso and L. H. Kauffman, World Scientific, 2013
- Physical Interpretations of Relativity Theory Proceedings of International Scientific Meeting PIRT-2013, Bauman Moscow State Technical University, 2013, editor, with M. C. Duffy, V. O. Gladyshev, A. N. Morozov and V. Pustovoit

### Papers on Physics, Mathematics, Computer Science and Biology

### FUNDAMENTAL SYMMETRIES

The fundamental parameters of physics. *Speculat. Sci. Tech.*, **6**, 69-80, 1983. Negative matter. *New Scientist*, 7 April 1990, 71.

- A new formal structure for deriving a physical interpretation of relativity. *Proceedings of Conference on Physical Interpretations of Relativity Theory II*, British Society for Philosophy of Science, London, September 1990, 264-8.
- Quantum indeterminacy, wave-particle duality and the physical interpretation of relativity theory from first principles. *Proceedings of Conference on Physical Interpretations of Relativity Theory III*, British Society for Philosophy of Science, London, September 1992, 296-310.
- Physics; let's get down to basics, in K. Bowden (ed.), *Aspects II*, 1999 (*Proceedings of XX ANPA Conference*, Cambridge, September 1998), 123-134.
- The Search for the Big TOE, Phlogiston, 1, 8-12, October 1999

A foundational approach to physics, arXiv:physics/0106054.

- The group structure bases of a foundational approach to physics, arXiv:physics/0110092, with J. P. Cullerne and B. D. Koberlein.
- The factor 2 and physical and mathematical duality, *Proceedings of Conference on Physical Interpretations of Relativity Theory VIII*, British Society for Philosophy of Science, London, September 2002, 446-61.

The factor 2 in fundamental physics, arXiv:physics/0110069.

The physical significance of the factor 2, in A. D. Ford (ed.), *Movements*, July 2002 (*Philosophical Aspects of XXIII ANPA Conference*, Cambridge, August 2001), 92-119.

Why does physics work?, *Hevelius*, **1**, 76-101, 2003.

- Representations of a Fundamental Theory, in K. Bowden (ed.), *Boundaries*, May 2003 (*Proceedings of XXIV ANPA Conference*, Cambridge, August 2002), 18-47.
  Duality as a fundamental component of physics, *Hevelius*, 2, 168-82, 2004.
- The origin and meaning of 3-dimensionality, in K. Bowden (ed.), *Spin*, May 2004 (*Proceedings of XXV ANPA Conference*, Cambridge, August 2003), 292-323.
- Physical interpretations of relativity theory and the fundamentals of space-time physics, *Proceedings of Conference on Physical Interpretations of Relativity Theory IX*, Volume II, British Society for Philosophy of Science, London, September 2004, 1-2.
- A fundamental structure for physics, in M. R. Adikhari, H. P. Mazumdar, M. C. Duffy and E. Trell, *Physical Interpretations of Relativity Theory II*, Calcutta 2004, 44-47.
- Physical Interpretations of Relativity Theory, *Vestnik Journal of The Bauman Moscow State Technical University* (Moscow), 2005, 201-209, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov.
- Theory of Relativity and its Physical Interpretations, *Science and Technology in Russia*, 2005, V. 4-5, 24-29, with M. C. Duffy, V. O. Gladyshev and A. N. Morozov (in Russian).
- Progress in Physical Interpretations of Relativity Theory, *Bulletin of BMSTU, Natural Sciences*, 2005, V. 4, 109-123, with M. C. Duffy, V. O. Gladyshev, A. N. Morozov and T. M. Gladysheva (in Russian)
- How to get something from nothing, chapter 10, 241-69, of N. V. Pope, A. D. Osborne and A. F. T. Winfield (eds.), *Immediate Distant Action and Correlation in Modern Physics The Balanced Universe*, Edwin Mellen Press, 2005.
- On nothing, or an exploration of the vacuum, in K. Bowden (ed.), *Conceptions*, 2006 (*Proceedings of XXVII ANPA Conference*, Cambridge, August 2005), 412-43.
- Think Outside the Box, *Physics World*, September 2008
- Are there alternatives to our present theories of physical reality? (Invited presentation at the 20th Anniversary Seminar of the Finnish National Society for Natural Philosophy in debate with Anton Zeilinger, 18 September 2008), arXiv:0912.3433.
- A Foundational Approach to Physics, *Prespacetime Journal*, 31, issue 14, 1256-1277, December 2012
- Symmetry in Physics from the Foundations, *Symmetry*, 24, 41-56, 2013
- Reducing the Number of Free Parameters, in Grenville J. Croll and Nicky Graves Gregory, *Explorations, Proceedings of ANPA 35*, 2015, 223-259

- A Hierarchy of Symmetries, *Proceedings of the Alternative Natural Philosophy Association*, 135-170, 2017
- How symmetries become broken, *Symmetry: Culture and Science*, 28 (3), 244-254, 2017
- Reducing the Number of Free Parameters, in Grenville J. Croll and Nicky Graves Gregory (eds.), *Explorations*, ANPA, 2015, 223-259
- Fundamental symmetries foundational to physics superspace, *Proceedings of International Conference PIRT-2015*, 422-438, December 2015
- How many dimensions are there?, in Richard L Amoroso, Louis H. Kauffman and Peter Rowlands (eds.), *Unified Field Mechanics Natural Science Beyond the Veil* of Spacetime Proceedings of the IX Symposium Honoring Noted French Mathematical Physicist Jean-Pierre Vigier, World Scientific, 2016, 46-54
- A Hierarchy of Symmetries, *Proceedings of the Alternative Natural Philosophy Association*, 135-170, 2017
- How symmetries become broken, *Symmetry: Culture and Science*, 28 (3), 244-254, 2017
- The Holographic Principle, Sustainable Industrial Processing Summit, 6, 77-84, 2017
- The fundamental symmetries behind Noether's first theorem, *Symmetry Culture and Science* 29(4):507-518, January 2018
- 3-Dimensionality, in J C Amson (ed), Chiasmus, 401-445, ANPA, May 2018
- The 'unreasonable' effectiveness of mathematics in physics, *Sustainable Industrial Processing Summit*, 2018
- Cellular Automata and the Foundations of Physics, SIPS, 2022, 16, 57-68

### NILPOTENT QUANTUM MECHANICS

- An algebra combining vectors and quaternions: A comment on James D. Edmonds' paper. *Speculat. Sci. Tech.*, **17**, 279-282, 1994.
- A new algebra for relativistic quantum mechanics. *Proceedings of Conference on Physical Interpretations of Relativity Theory V*, British Society for Philosophy of Science, London, September 1996, 381-7.
- Some interpretations of the Dirac algebra. Speculat. Sci. Tech., 19, 243-51, 1996.
- Quantum uncertainty, wave-particle duality and fundamental symmetries, in S. Jeffers, S. Roy, J-P. Vigier and G. Hunter (eds.), *The Present Status of the Quantum Theory of Light: A Symposium in Honour of Jean-Pierre Vigier (Fundamental Theories of Physics*, vol. 80, Kluwer Academic Publishers), Dordrecht, 1997, 361-372.
- The physical consequences of a new version of the Dirac equation, in G. Hunter, S. Jeffers, and J-P. Vigier (eds.), *Causality and Locality in Modern Physics and Astronomy: Open Questions and Possible Solutions (Fundamental Theories of Physics*, vol. 97, Kluwer Academic Publishers, Dordrecht, 1998, 397-402.
- Further considerations of the Dirac algebra. *Proceedings of Conference on Physical Interpretations of Relativity Theory VI*, British Society for Philosophy of Science, London, September 1998, 308-15.

- A derivation of particle structures and the Dirac equation from fundamental symmetries, in K. Bowden (ed.), *Aspects II*, 1999 (*Proceedings of XX ANPA Conference*, Cambridge, September 1998), 155-191, with J. P. Cullerne.
- The Dirac algebra and its physical interpretation, arXiv:quant-ph/00010094, with J. P. Cullerne.
- An algebra for relativistic quantum mechanics, in M. C. Duffy and M. Wegener (eds.), *Recent Advances in Relativity Theory, Volume 2: Material Interpretations*, Hadronic Press, Palm Harbor, Florida, 2001, 249-266, with J. P. Cullerne.
- Applications of the nilpotent Dirac state vector, arXiv:quant-ph/0103036, with J. P. Cullerne.
- QED using the nilpotent formalism, arXiv:quant-ph/0109069, with J. P. Cullerne.
- The nilpotent representation of the Dirac algebra, in K. Bowden (ed.), *Implications*, 2001 (*Proceedings of XXII ANPA Conference*, Cambridge, August 2000), 99-106, with J. P. Cullerne.
- Symmetry breaking as a consequence of the Dirac algebra, in K. Bowden (ed.), *Correlations*. May 2002 (*Proceedings of XXIII ANPA Conference*, Cambridge, August 2001), 161-190, with J. P. Cullerne.A comparison between two versions of the Dirac algebra, in K. Bowden (ed.), *Correlations*, May 2002 (*Proceedings of XXIII ANPA Conference*, Cambridge, August 2001), 191-195, with J. P. Cullerne and B. D. Koberlein.
- The nilpotent Dirac equation and its applications in particle physics, arXiv:quant-ph/0301071.
- From zero to the Dirac equation, in M. C. Duffy, V. O. Gladyshev and A. N. Morozov (eds.), *Physical Interpretations of Relativity Theory*, *Proceedings of International Scientific Meeting*, Moscow 2003, 13-22.
- Symmetry breaking and the nilpotent Dirac equation, *AIP Conference Proceedings*, **718**, 102-115, 2004.
- The nilpotent vacuum, *Hypercomplex Numbers in Geometry and Physics*, **2**, 97-111, 2004.
- A unified approach to the nilpotent vacuum, *Proceedings of Conference on Physical Interpretations of Relativity Theory IX*, British Society for Philosophy of Science, London, September 2004, 407-438.
- A computational path to the nilpotent Dirac equation, *International Journal of Computing Anticipatory Systems*, **16**, 203-18, 2005, with B. Diaz.
- The Dirac equation as the origin of symmetry breaking, in Richard L. Amoroso, Bo Lehnert and Jean-Pierre Vigier (eds.), *Beyond the Standard Model: Searching for Unity in Physics*, the Noetic Press, Orinda, USA, 23-33. (Also in *The Noetic Journal*, **6**, nos. 1-4, 435-50, 2005.)
- On nothing, or an exploration of the vacuum, in K. Bowden (ed.), *Against Bull*, 2005 (*Proceedings of XXVI ANPA Conference*, Cambridge, August 2004), 18-55.
- Nilpotence: the key to a theory of everything, ANPA, in K. Bowden (ed.), *Against Bull*, 2005 (*Proceedings of XXVI ANPA Conference*, Cambridge, August 2004), 231-46, with P. Marcer and B. Diaz.

Fermion interactions in the nilpotent formalism, in M. C. Duffy, V. O. Gladyshev, A. N. Morozov and P. Rowlands (eds.), *Physical Interpretations of Relativity Theory*, *Proceedings of International Scientific Meeting*, Moscow 2005, 15-24.

Removing redundancy in relativistic quantum mechanics, arXiv.org:physics/0507188.

- Fermion interactions and mass generation in the nilpotent formalism, *AIP Conference Proceedings*, **839**, 225-35, 2006
- A remarkable quantum mechanical discovery, *International Journal of Computing Anticipatory Systems*, **19**, 261-278, 2006, with P. Marcer.
- Nilpotent operators and particle states, in K. Bowden (ed.), *Foundations*, 2007 (*Proceedings of XXVIII ANPA Conference*, Cambridge, August 2006), 301-21.
- Idempotents and nilpotents, in K. Bowden (ed.), *Foundations*, 2007 (*Proceedings of XXVIII ANPA Conference*, Cambridge, August 2006), 322-23.
- A discrete version of the nilpotent Dirac equation, in K. Bowden (ed.), *Foundations*, 2007 (*Proceedings of XXVIII ANPA Conference*, Cambridge, August 2006), 324-26.
- A mathematical description of the fermionic state, *Hypercomplex Numbers in Geometry and Physics*, **4**, 1(7), 141-153, 2007.
- Minimalising quantum mechanics, in M. C. Duffy, V. O. Gladyshev, A. N. Morozov and P. Rowlands (ed.), *Physical Interpretations of Relativity Theory, Proceedings* of XIII International Scientific Meeting PIRT-2007, Moscow: 2-5 July 2007, Moscow, 2007, 39-48.
- Quantum mechanics and particle interactions from a single operator, *Mathematics, Physics and Philosophy in the Interpretations of Relativity Theory, Budapest:* 7-9 *September 2007, Proceedings*, Budapest, 2007, 137
- A minimalist approach to quantum mechanics and particle physics, *Exactness* (*Proceedings of XXIX ANPA Conference*, Cambridge, August 2007), 2008.
- Relativistic quantum mechanics from a single operator, *International Journal of Computing Anticipatory Systems*, **22**, 206-17, 2008.
- Beyond the Dirac Equation, *Physical Interpretations of Relativity Theory, Proceedings* of XV International Scientific Meeting PIRT, Moscow, July 2009, 85-94
- What is Vacuum? A Nilpotent Solution, in K. Bowden and A. D. Ford (ed.), *Reflexivity* (*Proceedings of XXX ANPA Conference*, Cambridge, August 2008), 89-113, 2010.
   Physical Interpretations of Nilpotent Quantum Mechanics, arXiv: 1004.1523.
- Dual Vector Spaces and Physical Singularities, *AIP Conference Proceedings*, **1316**, 102-111, 2010

What is vacuum?, arXiv:0810.0224.

- "Hidden" Parameters Describing Internal Motion Within Extended Particle Elements, *AIP Conference Proceedings*, **1316**, 1-27, 2010, with R. L. Amoroso, L. H. Kauffman, E. A. Rauscher, and J.-P. Vigier
- Dual vector spaces as a basis for physics, *Proceedings of Conference on Physical Interpretations of Relativity Theory*, British Society for Philosophy of Science, London, September 2010
- Introduction to M. C. Duffy, V. O. Gladyshev, A. N. Morozov and P. Rowlands (eds.), Physical Interpretations of Relativity Theory, Proceedings of International Scientific

*Meeting PIRT-2006*, London, 8-11 September 2006, Bauman Moscow State Technical University, 2011, 3

- Breaking the Dirac code, in M. C. Duffy, V. O. Gladyshev, A. N. Morozov and P. Rowlands (eds.), *Physical Interpretations of Relativity Theory, Proceedings of International Scientific Meeting PIRT-2006*, London, 8-11 September 2006, Bauman Moscow State Technical University, 2011, 376-392
- Quantum Mechanics and Physical Meaning, *Proceedings of XXXI ANPA Conference* (Cambridge, August 2010), May 2011
- Duality and nonlocality, in M. C. Duffy, V. O. Gladyshev, A. N. Morozov and P. Rowlands (eds.), *Physical Interpretations of Relativity Theory, Proceedings of XV International Scientific Meeting PIRT*, Moscow, July 2011, Bauman Moscow State Technical University, 2012, 263-274
- The Berwald-Moor metric in nilpotent Dirac spinor space, *Bulletin of the Transilvania University of Brasov*, 5 (54), no. 1, 71-84, 2012
- A null Berwald-Moor metric in nilpotent spinor space, Symmetry, 23, no. 2, 179-188, 2012
- Removing Redundancy in Relativistic Quantum Mechanics, *Prespacetime Journal*, 3I, issue 14, 1311-1354, December 2012
- What Is Vacuum?, *Prespacetime Journal*, 31, issue 14, 1356-1386, December 2012
- Are There Alternatives to Our Present Theories of Physical Reality?, *Prespacetime Journal*, 31, issue 14, 1387-1403, December 2012
- Physical Interpretations of Nilpotent Quantum Mechanics, *Prespacetime Journal*, 31, issue 14, 1404-1441, December 2012
- The Factor 2 in Fundamental Physics, *Prespacetime Journal*, 31, issue 14, 1278-1310, December 2012
- Space and Antispace, in R. L. Amoroso, L. H. Kauffman and Peter Rowlands (eds.), *The Physics of Reality Space, Time, Matter, Cosmos*, World Scientific, 2013, 29-37
- Exploring Novel Cycle Extensions of Hamilton's Dual-Quaternion Algebra, in R. L. Amoroso, L. H. Kauffman and Peter Rowlands (eds.), *The Physics of Reality Space, Time, Matter, Cosmos*, World Scientific, 2013, 81-91, with Richard L. Amoroso and Louis H. Kauffman
- Dual spaces, particle singularities and quartic geometry, *Hypercomplex Numbers in Geometry and Physics*, **10**, 234-246, 2013
- A Dual Space as the Basis of Quantum Mechanics and Other Aspects of Physics, in John C Amson and Louis H. Kauffman (eds.), *Scientific Essays in Honor of H Pierre Noyes on the Occasion of His 90<sup>th</sup> Birthday*, World Scientific, 2014, 318-338
- A Dual Space as the Basis of Quantum Mechanics and Other Aspects of Physics (another version), in Grenville J. Croll and Nicky Graves Gregory (eds.), *Groupings* (*Proceedings of XXXIV ANPA Conference*, Rowlands Castle, August 2013), 107-132, 2014
- Duality, Chirality and Singularity, in Grenville J. Croll and Nicky Graves Gregory (eds.), *Groupings (Proceedings of XXXIV ANPA Conference*, Rowlands Castle, August 2014, 229-258, 2014 (presented at ANPA XXXIII, Cambridge, August 2012)

- Local and nonlocal, International Journal of Computing Anticipatory Systems, 27, 106-123, 2014
- Nilpotent Quantum Theory: A Review, Bulletin of the Transilvanian University of Braşov, 7(56), No. 2, 99-120, 2014
- A Dual Space as the Basis of Quantum Mechanics and Other Aspects of Physics, in Grenville J. Croll and Nicky Graves Gregory (eds.), *Groupings*, 107-132, 2014, and in John C. Amson and Louis H. Kauffman (eds.), *Scientific Essays in Honor of H Pierre Noyes on the Occasion of His 90<sup>th</sup> Birthday*, World Scientific, 2014, 318-338
- Nonlocality, in A. D. Ford (ed.) *Haecceity: Proceedings of ANPA 32*, 227-250 and Grenville J. Croll and Nicky Graves Gregory, *Explorations*, *Proceedings of ANPA 35*, 2015, 195-222
- Dirac equations in nilpotent quaternionic space-antispace and eight dimensional (8D) complex Minkowski space, in Richard L Amoroso, Louis H. Kauffman and Peter Rowlands (eds.), Unified Field Mechanics Natural Science Beyond the Veil of Spacetime Proceedings of the IX Symposium Honoring Noted French Mathematical Physicist Jean-Pierre Vigier, World Scientific, 2016, 66-87, with Elizabeth A. Rauscher and Richard L Amoroso
- Dual vector spaces and physical singularities, in Richard L Amoroso, Louis H. Kauffman and Peter Rowlands (eds.), *Unified Field Mechanics Natural Science Beyond the Veil of Spacetime Proceedings of the IX Symposium Honoring Noted French Mathematical Physicist Jean-Pierre Vigier*, World Scientific, 2016, 92-101
- Isonilpotents and Self-Organization, *Sustainable Industrial Processing Summit*, 4, 71-84, 2016
- Nilpotent quantum mechanics: analogs and applications, *Frontiers in Physics*, 5, 28, 2017 with P. Marcer
- Dual spaces, particle singularities and quartic geometry, *Acta Mathematica Academiae Paedagogicae Nyíregyháziensis*, 31 (1), 121-137, 2015
- Isonilpotents and Self-Organization, *Sustainable Industrial Processing Summit*, 4, 71-84, 2016
- Nilpotent quantum mechanics: analogs and applications, *Frontiers in Physics*, 5, 28, 2017 with P. Marcer
- Representations of the Nilpotent Dirac Matrices, in R L Amoroso, L H Kauffman, P Rowlands and G Albertina, *Unified Field Mechanics II: Preliminary Formulations and Empirical Tests, 10th International Symposium Honouring Mathematical Physicist Jean-Pierre Vigier,* 26-33, World Scientific, 2018, with S Rowlands
- Idempotent or nilpotent?, AIP Conference Proceedings, 2046 (1), 020091, 2018

Nature's algebra, Sustainable Industrial Processing Summit, 13, 31-48, 2019

- Sixty (plus) Reasons for Using the Algebraic Version of the Nilpotent Dirac Equation, in J. C. Amson (ed), *Aporia, 40th Anniversary Proceedings 1979-2019*, ANPA, 2020, 443-493
- Exact solutions of the nilpotent Dirac equation, *Journal of Physics: Conference Series*, 1557 (1), 012035, 2020, with S. Rowlands
- The Dirac equation and the Majorana Dirac equation, arXiv:2009.04811, 2020, with Louis H Kauffman

A Quaternionic Form of the Dirac Equation Representing the Origin of Symmetry Breaking, in R L Amoroso, L H Kauffman and P Rowlands (eds), *Fundamental Physics at the Vigier Centenary "L'Hérétique de la Physique" Lives On*, 2022, chapter 12, 333-356

Inside the Dirac equation, ANPA 44, 2023 (to be published)

Mathematics and Physical Meaning in Relativistic Quantum Mechanics, in H M Colin Garcia et al (ed), *Scientific Legacy of Professor Zbigniew Oziewicz*, World Scientific, 2024, 107-127

### PARTICLES

- A symmetry principle for deriving particle structures. *Proceedings of Conference on Physical Interpretations of Relativity Theory VI*, British Society for Philosophy of Science, London, September 1998, 316-33, with J. P. Cullerne.
- The Dirac algebra and charge accommodation, in K. Bowden (ed.), *Participations*, 2000 (*Proceedings of XXI ANPA Conference*, Cambridge, September 1999), 89-111, with J. P. Cullerne.
- *SU*(5) and grand unification, in K. Bowden (ed.), *Participations*, 2000 (*Proceedings of XXI ANPA Conference*, Cambridge, September 1999), 124-146, with J. P. Cullerne.
- The Dirac algebra, particle states, and *SU*(5) symmetry. *Proceedings of Conference on Physical Interpretations of Relativity Theory VII*, British Society for Philosophy of Science, London, September 2000, 305-319, with J. P. Cullerne.
- The connection between the Han-Nambu quark theory, the Dirac equation and fundamental symmetries. *Nuclear Physics* **A 684**, 713-5, 2001, with J. P. Cullerne.

The Dirac algebra and grand unification, arXiv:quant-ph/0106111, with J. P. Cullerne. An investigation of the Higgs mechanism, in K. Bowden (ed.), *Implications*, 2001

- (*Proceedings of XXII ANPA Conference*, Cambridge, August 2000), 81-93, with J. P. Cullerne.
- Charge accommodation and the Combinatorial Hierarchy, in K. Bowden (ed.), *Correlations*, May 2002 (*Proceedings of XXIII ANPA Conference*, Cambridge, August 2001), 196-198, with J. P. Cullerne.
- A primitive axiomatic formulation of fermionic states, *Hadronic Journal*, **28**, 43-92, 2005.
- A relativistic quantum model of the hadronic state, *Hadronic Journal*, **29**, 613-636, 2006.
- What Is the Meaning of Fractional Electric Charges?, *Prespacetime Journal*, 3, issue 12, 1110-1197, October 2012
- Why Do Quarks Have Electric Charges?, in R L Amoroso, L H Kauffman, P Rowlands and G Albertina, *Unified Field Mechanics II: Preliminary Formulations and Empirical Tests, 10th International Symposium Honouring Mathematical Physicist Jean-Pierre Vigier,* 399-491, World Scientific, March 2018, 399-411
- Constructing the Standard Model fermions, *Journal of Physics: Conference Series*, 1251 (1), 012004, 2019
- Are octonions necessary to the Standard Model?, *Journal of Physics: Conference Series*, 1251 (1), 012044, 2019, with S Rowlands

- An approach to Grand Unification, *Journal of Physics Conference Series*, 2081(1):012010, November 2021
- A Route Towards Grand Unification, SIPS, 2023, 13, 149-160

### GRAVITY

- Is the gravitational field really nonlinear? *Proceedings of Conference on Physical Interpretations of Relativity Theory III*, British Society for Philosophy of Science, London, September 1992, 311-318.
- Experimental testing and the physical interpretation of general relativity. *Proceedings* of Conference on Physical Interpretations of Relativity Theory IV, British Society for Philosophy of Science, London, September 1994, 298-312.
- The classical interpretation of relativistic light deflection. *Proceedings of Conference on Physical Interpretations of Relativity Theory IV*, British Society for Philosophy of Science, London, September 1994, vol. 2, 161-2.
- A simple approach to the experimental testing of general relativity. *Physics Education*, vol. **32**, no. 1, 49-55, January 1997.
- Why gravity acts instantaneously at a distance, in A. E. Chubykalo, N. V. Pope, and R. Smirnov-Rueda (eds.), *Instantaneous Action at a Distance in Modern Physics: Pro and Contra (A Volume in the Contemporary Fundamental Physics Series)*, Nova Science Publishers, Inc., New York, 1999, 157-166.
- Can gravity be included in grand unification?, in R. L. Amoroso, G. Hunter, M. Kafatos and J-P. Vigier (eds.), *Gravitation and Cosmology: From the Hubble Radius to the Planck Scale*, Kluwer, 2002, 279-86, with J. P. Cullerne.
- A possible origin for the microwave background radiation, *Proceedings of Conference on Physical Interpretations of Relativity Theory VIII*, British Society for Philosophy of Science, London, September 2002, 462-73.
- The accelerating universe, 'dark energy', and Machian inertia, *Proceedings of Conference on Physical Interpretations of Relativity Theory IX*, Volume II, British Society for Philosophy of Science, London, September 2004, 561-2.
- Non-Local Gravity and Dark Energy, *Galilean Electrodynamics*, **20**, no. 3, 42, 48, 53, 60, 2009.
- Gravity, the microwave background radiation, and information processing, *Proceedings, Mathematics, Physics and Philosophy in the Interpretations of Relativity Theory*, Budapest 2009, 194-220.
- Preface to Mogens True Wegener, Non-Standard Relativity, Copenhagen 2012
- The cosmological implications of nonlocal gravity, *Journal of Computational Methods in Sciences and Engineering*, 13, 189-210, 2013
- A critical value for Dark Energy, arXiv, 1206.1420
- The problems of the 'standard' model of cosmology and the solutions arising from Santilli's theory, *Hadronic Journal*, 35, 593-608, 2012
- Does Dark Energy have a Critical Value?, in M. C. Duffy, V. O. Gladyshev, A. N. Morozov, V. Pustovoit (eds.), *Physical Interpretations of Relativity Theory Proceedings of International Scientific Meeting PIRT-2013*, Bauman Moscow State Technical University, 2013, 260-266

- Gravity, Inertia and Dark Energy, *American Journal of Modern Physics*, 4, 18-22, January 2015 (online 2014)
- Dark energy-a critical value, *Journal of Physics: Conference Series*, 1051 (1), 012002, 201, 2015
- Could Anyone But Newton Have Put the Heavens in Order, in Frank Swain (ed), *The Universe Next Door*, New Scientist, 2017, 70-74
- Fundamental Errors in Physics, in J C Amson (ed), *Chiasmus*, 447-477, ANPA, May 2018
- Gravity: local or nonlocal, *Journal of Physics: Conference Series*, 1557 (1), 012004, 2020

### UNIVERSAL REWRITE SYSTEM

A universal alphabet and rewrite system, arXiv:cs.OH/0209026, with B. Diaz.

- The infinite square roots of -1, *International Journal of Computing Anticipatory Systems*, **19**, 229-235, 2006, with B. Diaz.
- Mathematics and Physics as Emergent Aspects of a Universal Rewrite System, International Journal of Computing Anticipatory Systems, **25**, 115-131, 2010
- Information, Bifurcation and Entropy in the Universal Rewrite System, with P. Marcer, in *International Journal of Computing Anticipatory Systems*, 27, 203-215, 2014
- Universal Rewrite and Self-Organization, with P. Marcer, *International Journal of Computing Anticipatory Systems*, 27, 227-246
- Iterative and Recursive, in J. C. Amson (ed), *Aporia, 40th Anniversary Proceedings* 1979-2019, ANPA, 2020, 05-539
- The Universal Rewrite System adapted for Formal Language Theory, Classical and Quantum Computing, *Vigier12*, Liege, 1-36, December 2020, with S Rowlands
- The universal rewrite system coded, *Journal of Physics: Conference Series*, 2197(1): 012023, March 2022, with S. Rowlands

The Universal Rewrite System, ANPA 2022, 401-426 with S. Rowlands

- A universal rewrite system adapted for formal language theory, classical and quantum computing, *Journal of Physics: Conference Series*, 2197 (1), 012024, 2022, with S Rowlands
- Category theory applied to the Klein-4 parameter group and the universal rewrite system, ANPA44, 2023 with S. Rowlands (to be published)

### GENETICS

- Fundamental mathematical structures applied to physics and biology, in K. Bowden (ed.), *Conceptions*, 2006 (*Proceedings of XXVII ANPA Conference*, Cambridge, August 2005), 324-60, with V. Hill.
- Nature's code, in K. Bowden (ed.), Foundations, 2007 (Proceedings of XXVIII ANPA Conference, Cambridge, August 2006), 282-300, with V. Hill. = Nature's code (I), in K. Bowden (ed.), Foundations (Proceedings of XXVIII ANPA Conference, Cambridge, August 2006), 282-300, 2007, with V. Hill

Nature's code I, AIP Conference Proceedings, 1051, 117-126, 2008, with V. Hill.

Nature's code II, in K. Bowden and A. D. Ford (ed.), *Exactness (Proceedings of XXIX ANPA Conference*, Cambridge, August 2007), 160-177, 2008.

De code van der natuur – vormen van leven, Jaarbeok Integrale Geneeskunde 2008, Tidschrift voor Integrale Geneeskunde Jaargang 24, 184-198, 2008, with V. Hill

Nature's Code III?, in K. Bowden and A. D. Ford (ed.), *Reflexivity* (*Proceedings of XXX ANPA Conference*, Cambridge, August 2008), 127-157, 2010, with V. Hill

- Nature's Fundamental Symmetry Breaking, *International Journal of Computing Anticipatory Systems*, **25**, 144-159, 2010, with V. J. Hill
- The Numbers of Nature's Code, *International Journal of Computing Anticipatory Systems*, **25**, 160-175, 2010, with V. J. Hill
- A mathematical representation of the genetic code, in Richard L Amoroso, Louis H. Kauffman and Peter Rowlands (eds.), *Unified Field Mechanics Natural Science Beyond the Veil of Spacetime Proceedings of the IX Symposium Honoring Noted French Mathematical Physicist Jean-Pierre Vigier*, World Scientific, 2015, 553-559, with V. J. Hill

#### SYSTEMS

- Zenergy: The 'phaseonium' of dark energy that fuels the natural structures of the Universe, *International Journal of Computing Anticipatory Systems*, **16**, 189-202, 2005, with P. Marcer, E. Mitchell and W. Schempp.
- The Evolutionary 'Anthropic' Semantic Principle, in K. Bowden (ed.), *Conceptions*, 2006 (*Proceedings of XXVII ANPA Conference*, Cambridge, August 2005), 361-70, with P. Marcer.
- The Evolutionary 'Anthropic' Semantic Principle II, in K. Bowden (ed.), *Foundations*, 2007 (*Proceedings of XXVIII ANPA Conference*, Cambridge, August 2006), 327-34, with P. Marcer
- How intelligence evolved?, in *Quantum Interaction*, *Papers from the AAAI Spring Symposium*, *Technical Report SS-07-08*, 2007, with P. Marcer.
- Riemann Hypothesis = The Riemann zeta function, *International Journal of Computing Anticipatory Systems*, **22**, 131-140, 2008, with B. Diaz and P. Marcer.
- Artificial intelligence and Nature's fundamental process, in *Proceedings of the Second Quantum Interaction Symposium (QI-2008)*, 19-26, with P. Marcer.
- How General is Nilpotency?, in K. Bowden and A. D. Ford (ed.), *Reflexivity* (*Proceedings of XXX ANPA Conference*, Cambridge, August 2008), 114-126, 2010, with P. Marcer.
- The Grammatical Universe and the Laws of Thermodynamics and Quantum Entanglement, *AIP Conference Proceedings*, **1303**, 161-167, 2010, with P. Marcer
- Further Evidence in Support of the Universal Nilpotent Grammatical Computational Paradigm of Quantum Physics, *AIP Conference Proceedings*, **1316**, 90-101, 2010, with P. Marcer
- The 'Logic' of Self-Organizing Systems, *AAAI Technical Reports* 2010-08-020, with P. Marcer
- Preface to R. L. Amoroso, L. H. Kauffman and Peter Rowlands (eds.), *The Physics of Reality Space, Time, Matter, Cosmos*, World Scientific, 2013, xiii, with P. Marcer
- A Computational Unification of Scientific Law: Spelling out a Universal Semantics for Physical Reality, in R. L. Amoroso, L. H. Kauffman and Peter Rowlands (eds.),

*The Physics of Reality Space, Time, Matter, Cosmos*, World Scientific, 2013, 50-59, with P. Marcer

- Is the Human Brain Quantum Mechanical?, with P. Marcer, in *International Journal of Computing Anticipatory Systems*, 27, 217-24, 2014
- Computational tractability beyond Turing?, in Richard L Amoroso, Louis H. Kauffman and Peter Rowlands (eds.), *Unified Field Mechanics Natural Science Beyond the Veil of Spacetime Proceedings of the IX Symposium Honoring Noted French Mathematical Physicist Jean-Pierre Vigier*, World Scientific, 2015, 33-38, with Peter Marcer
- Self-organized computational rewrite language L predicating an optimal thermodynamic cosmic birth-order automorphic evolution of intelligent life, and consciousness, as nature's IT, *Journal of Physics: Conference Series*, 1251 (1), 012032, 2019, with PJ Marcer and W Schempp