KEY PUBLICATIONS

John Cardy

(This list excludes publications purely in theoretical particle physics.)

27. Electron Localisation in Disordered Systems and Classical Solutions in Ginzburg-Landau Field Theory, *J. Phys.* **C11**, L321, 1978. *This paper derived the correct form of the prefactors in the Lifshitz tail in the density of states.*

35. Directed Percolation and Reggeon Field Theory (with R. Sugar), *J. Phys.* **A13**, L423, 1980. *Established a link between high energy diffraction scattering and the simplest model of a non-equilibrium phase transition. 278 citations.*

38. Random Symmetry Breaking Fields and the XY Model (with S. Ostlund), *Phys. Rev. B* **25**, 6899, 1981. *Recognised the importance of off-diagonal replica couplings and correctly predicted the* $\exp(-(\log R)^2)$ *form of the correlation function. 168 citations.*

40. Phase Structure of Z_p Models in the Presence of a θ Parameter, *Nucl. Phys.* **B205**, [FS5]1, 1982. *The first example of 'complex duality.'*

44. Critical Behavior of Impure Superconductors in $4-\epsilon$ Dimensions (with D. Boyanovsky), *Phys. Rev. B* **25**, 7058, 1982. *An interesting example of spiral renormalisation group flows.*

55. Critical Behavior at an Edge, *J. Phys.* **A16**, 3617, 1983. *The first example of critical exponents which continuously depend on the geometry.*

61. Conformal Invariance and Universality in Finite Size Scaling, *J. Phys.* **A17**, L385, 1984. *Explained the observed relation between critical exponents and finite-size scaling amplitudes in terms of conformal invariance. Has become a standard tool for numerically extracting critical exponents. 506 citations.*

62. Conformal Invariance and Surface Critical Behavior, *Nuclear Physics* **B240 [FS12]**, 514-532, 1984. *The first paper in boundary conformal field theory - conjectured exact results for boundary exponents and correlation functions, later related to stochastic Lowener evolution. 478 citations.*

65. Conformal Invariance and the Yang-Lee Edge Singularity in Two Dimensions, *Phys. Rev. Lett.* **54**, 1354, 1985.*An early application of non-unitary conformal field theory.*

67. Epidemic Models and Percolation (with P. Grassberger), *J. Phys. A: Math. Gen.* **18**, L267-271, 1985. *A non-Markovian dynamical field theory, applied to a problem in mathematical biology.*

70. Conformal Invariance in 'Phase Transitions and Critical Phenomena', eds. Domb and Lebowitz, Vol. XI, (Academic, New York, 1986). *The first review article on this subject.*

71. Operator Content of Two-Dimensional Conformally Invariant Theories, *Nuclear Physics* **B270**, 186, 1986. *The classification of two-dimensional critical theories using modular invariance. Also applied to the computation of black hole entropy as the 'Cardy-Verlinde formula.' 915 citations.*

72. Conformal Invariance, the Central Charge, and Universal Finite-Size Amplitudes (with H. W. J. Blote and M. P. Nightingale), *Phys. Rev. Lett.* **56**, 742, 1986. *Showed how the central charge appears in finite-size scaling. Now the standard way of measuring this numerically. 829 citations.*

73. Field Theory of Critical Behavior in a Driven Diffusive System (with K. Leung), *J. of Statistical Phys.* **44**, 567, 1986. *Dynamical field theory of non-equilibrium steady state.*

84. Finite-Size Dependence of the Free Energy in Two-Dimensional Critical Systems, (with I. Peschel), *Nucl. Phys. B* **300** [**FS22**], 377, 1988. *Generalised the ideas of M. Kac on 'how to hear the shape of a drum.'*

86. Universal Amplitude in the Sizes of Rings in Two Dimensions, *J. Phys. A: Math. Gen.* **21**, L797, 1988. *The mean area divided by the mean radius of gyration is* $4\pi/5$.

89. Is There a c-theorem in Four Dimensions? *Phys. Lett. B* **215**, 749, 1988. *Conjectured and gave evidence for what is now known as the a-theorem. After many increasingly stringent tests, this was finally proved in 2011 by Kamargodski and Schwimmer.*

90. Boundary Conditions, Fusion Rules and the Verlinde Formula, *Nucl. Phys. B* **324**, 581, 1989. *Showed how to classify different kinds of conformally invariant boundary conditions, through the so-called 'Cardy conditions', and developed the concept of 'boundary condition changing operators'. This had important applications in quantum impurity problems and in string theory. 620 citations.*

92. S-Matrix of the Yang-Lee Edge Singularity in Two Dimensions (with G. Mussardo), *Phys. Lett. B* **225**, 275, 1989. *The simplest non-trivial S-matrix.*

94. Form Factors of Descendent Operators in Perturbed Conformal Field Theories (with G. Mussardo), *Nucl. Phys. B*, **B340**, 387, 1990. *Showed how to connect all the local operators away from the critical point with those in the conformal field theory.*

98. Bulk and Boundary Operators in Conformal Field Theory, (with D. Lewellen), *Phys. Lett.* **B259**, 274, 1991. *The last step in linking bulk and boundary CFT. Related to boundary entropy. 194 citations.*

101. Critical Percolation in Finite Geometries, *J. Phys. A* **25**, L201, 1992. *Conjectured the so-called Cardy formula for the crossing probability in a rectangle. This motivated several mathematicians to prove this, leading to the development of SLE. 199 citations.*

104. Critical Exponents of the Chiral Potts Model from Conformal Field Theory, *Nucl. Phys.* **B389[FS]**, 577, 1993. *Provided a field theoretic explanation for the results of Baxter et al.*

109. Universal Properties of Self-Avoiding Walks from Two-Dimensional Field Theory (with G. Mussardo), *Nucl. Phys. B* **410**, 451, 1993. *Showed how to use form factor methods to extract physically measurable information.*

110. Mean Area of Self-Avoiding Loops, *Phys. Rev. Lett.* **72**, 1580, 1994. *The mean area divided by the mean square radius of gyration is* $4\pi/5$.

116. Renormalization Group Study of the $A + B \rightarrow 0$ Diffusion-Limited Reaction (with B. P. Lee), *J. Stat. Phys.* **80**, 971, 1995. *One of a series of papers applying field theoretic RG methods to reaction-diffusion problems.*

118. Effect of Random Impurities on Fluctuation-Driven First Order Transitions, *J. Phys. A* **29**, 1897, 1996. *An example of RG flows which begin and end at the same fixed point.*

119. *Scaling and Renormalisation in Statistical Physics*, 254 pp., Cambridge University Press, 1996. *Graduate textbook, currently has sold over 4000 copies.*

122. Theory of Branching and Annihilating Random Walks (with U. Tauber), *Phys. Rev. Lett.* **77**, 4780, 1996. *A systematic theoretical investigation of a well-studied problem.*

126. Critical Behaviour of Random Bond Potts Models (with J. L. Jacobsen), *Phys. Rev. Lett.* **79**, 4063, 1997. *A mapping between the effect of randomness on first order transitions and the random field Ising model.*

142. Linking numbers for self-avoiding loops and percolation: application to the spin quantum Hall transition, *Phys. Rev. Lett.* **84**, 3507, 2000. *Many new results including the exact value of the universal conductance.*

146. Exact Scaling Functions for Self-Avoiding Loops and Branched Polymers, *J. Phys. A* **34**, L665, 2001. *Field theory explanation of a non-trivial scaling function of two variables.*

147. Quantum and Classical Localisation, the Spin Quantum Hall Effect and Generalisations (with E. A. Beamond and J. T. Chalker), *Phys. Rev. B.* **65**, 214301, 2002. *A general mapping between quantum network models and classical random walks.*

149. Crossing Formulae for Critical Percolation in an Annulus. *J. Phys. A* **35**, L565, 2002. *Extension of the Cardy formula to the annulus.*

151. Exact Results for the Universal Area Distribution of Clusters in Percolation, Ising and Potts Models (with R. M. Ziff), *J. Stat. Phys.* **110**, 1, 2003. *Derived and numerically tested the so-called Cardy-Ziff formula.*

156. Entanglement Entropy in Quantum Field Theory (with P. Calabrese), *J. Stat. Mech.*, P06002, 2004. *Developed a systematic method for computing entanglement in extended quantum systems.*

161. SLE for theoretical physicists, review article, *Ann. Phys.* **318(1)**, 81, 2005. *Physicists' review of stochastic Loewner evolution and its connection to CFT.*

166. Time-dependence of correlation functions following a quantum quench (with P. Calabrese), Phys. Rev. Lett. **96**, 136801, 2006.*Applied field theory methods to the time-development of extended quantum systems after a sudden change in a parameter – coined the term 'quantum quench.'*

183. Discretely Holomorphic Parafermions and Integrable Loop Models (with Y. Ikhlef), *J. Phys. A* **42**, 102001, 2009. *Established a connection between existence of discretely holomorphic observables in lattice models and their integrability.*