For more than four decades, John L. Cardy has been a nexus of a very large community of theoretical physicists working at the crossroads of quantum field theory, statistical mechanics, and condensed matter. His research has been hugely influential over diverse fields such as conformal and integrable field theories, quantum impurity problems, non-equilibrium statistical mechanics, disordered systems, percolation and stochastic Loewner evolution, quantum entanglement in extended systems, and string theory. John's work has regularly inspired other researchers, started new fields, and changed paradigms, via both technical innovations and profound conceptual insights, clarifications and extrapolations. His expository skills, as displayed in his book on the renormalisation group and in many elegantly-written lecture notes, have strongly influenced two generations of theoretical physicists.

John Cardy has received a number of distinctions and awards throughout his career. These include:

- Fellow of the Royal Society since 1991,
- the Dirac Medal of the Institute of Physics in 2000,
- the Lars Onsager Prize by the American Physical Society in 2004,
- the Boltzmann Medal by the International Union of Pure and Applied Physics in 2010,
- the Dirac Medal of the International Centre for Theoretical Physics in 2011.

Cardy started his research career in particle theory, but was soon exploiting the interplay between field theory and statistical mechanics, to the benefit of both areas. A key early paper with Sugar explained how reggeon field theory and directed percolation were in the same universality class [1]. A first important contribution to statistical mechanics is in disordered systems [2], where Cardy and Ostlund wrote a fundamental paper on applying the renormalization group to the XY model with a random symmetry-breaking field.

His best-known and most influential works come a few years later, where he was one of the key people responsible for the rise of conformal field theory to its central role in theoretical physics. One major formal contribution was his invention of two-dimensional boundary conformal field theory [3]. He also was one of the first to show the utility of applying conformal field theories to problems in statistical mechanics and condensed-matter physics. For example, he showed that for each universality class there are a finite number of possible boundary conditions compatible with scale and conformal invariance, and gave a classification of them [3, 4]. In the condensed-matter context Cardy's work led to major progress in the now-enormous field of quantum impurity problems, most famously in Affleck and Ludwig's work on the multi-channel Kondo problem. Later this work became essential to string theorists interested in D-branes.

Cardy's work on modular invariance [4] showed how significant constraints arise from combining conformal symmetry with the seemingly innocuous symmetry of interchanging the two directions in a two-dimensional classical system (or, equivalently, interchanging space and time in a one-dimensional quantum system with Lorentz invariance). These constraints completely determine the critical exponents for a given universality class in two dimensions. This work on modular invariance and boundary conditions has had an enormous impact far beyond statistical mechanics. Subsequent work built on this to allow a deep understanding of rational conformal field theories and topological field theory. Some of the many commonly-used applications of this work are the Cardy-Verlinde formula for black-hole entropy; Verlinde's formula for topological field theories; and Cardy's extension of these results to conformal field theories with boundaries [5]. In mathematics, this has resulted in the field of "quantum topology", which has close links to knot theory.

Another key contribution of Cardy's [6] (in collaboration with Blöte and Nightingale, and achieved independently by Affleck [7]) was the demonstration that it is possible to extract the central charge of conformally invariant systems in two dimensions from finite-size corrections of the free energy. Cardy's results have been used in hundreds of works to do precisely that, before he pointed out an even better way to do the same [8].

Cardy has also contributed many results to the study of geometric models in statistical mechanics, such as percolation and self-avoiding random walks. His exact computation of the crossing probabilities in percolation [9] led to an explosion of work among mathematicians. This result, now known as the Cardy-Smirnov formula, is one of the seminal ones in the field of Schramm-Loewner evolution, which provides a novel and rigorous approach to geometric models [10].

In more recent times Cardy has made several key contributions to two particularly active and exciting areas of research in the last decade, namely entanglement measures in extended systems and quantum quenches. His work with Calabrese [8, 11, 12] have become fundamental references, with the latter even coining the now-conventional name *quantum quench*. In [8] they developed of a systematic replica method to calculate the entanglement entropy in quantum field theory, and in particular in conformal field theories. In [11] they highlighted the role played by the entanglement entropy in the description of many body quantum systems out of equilibrium. In [12] they initiated the study of the non-equilibrium unitary dynamics of conformal field theory and low-dimensional systems.

We believe that John Cardy is one of the greatest theoretical physicists of our time. His work is highly respected, admired, enjoyed and cited. This special collection of articles written for his seventieth birthday expresses our gratitude for his continuing role as a guide for our community.

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