

Random Surfaces and Quantum Gravity


Edited by
Orlando Alvarez
Enzo Marinari and
Paul Windey

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Random Surfaces And Quantum Gravity

**Orlando Alvarez, Enzo Marinari, Paul
Windey**



Random Surfaces And Quantum Gravity:

Random Surfaces and Quantum Gravity Orlando Alvarez, Enzo Marinari, Paul Windey, 2013-03-09 The Cargese Workshop Random Surfaces and Quantum Gravity was held from May 27 to June 2 1990 Little was known about string theory in the non perturbative regime before October 1989 when non perturbative equations for the string partition functions were found by using methods based on the random triangulations of surfaces This set of methods provides a description of non critical string theory or equivalently of the coupling of matter fields to quantum gravity in two dimensions The Cargese meeting was very successful in that it provided the first opportunity to gather most of the active workers in the field for a full week of lectures and extensive informal discussions about these exciting new developments The main results were reviewed recent advances were explained new results and conjectures which appear for the first time in these proceedings were presented and discussed Among the most important topics discussed at the workshop were The relation of KdV theory to loop equations and the Virasoro algebra new results in Liouville field theory effective 1+1 dimensional theory for 2D quantum gravity coupled to critical matter and its fermionization proposal for a new geometrical interpretation of the string equation and possible definition of quantum Riemann surfaces discussion of the string equation for the multi matrix models links with topological field theories of gravity issues in using target space supersymmetry to define good theories definition of the partition function via analytic continuation new models of random surfaces

Web of Evil Judith A. Jance, 2007 A woman finds herself the prime suspect when her estranged husband is found murdered

Random Surfaces and 2D Quantum Gravity Spain) Workshop on Random Surfaces and 2D Quantum Gravity (1991 : Barcelona, 1992

Two Dimensional Quantum Gravity And Random Surfaces - 8th Jerusalem Winter School For Theoretical Physics David J Gross, Tsvi

Piran, Steven Weinberg, 1991-12-17 In the past few years there has been much study of random two dimensional surfaces These provide simple models of string theories with a few degrees of freedom as well as toy models of quantum gravity They have possible applications to the statistical mechanics of phase boundaries and to the development of an effective string description of QCD Recently methods have been developed to treat these theories nonperturbatively based on discrete triangulations of the surfaces that can be generated by simple matrix models Exact solutions with a rich mathematical structure have emerged All these matters are discussed fully in this book

Random Surfaces and Quantum Gravity

Orlando Alvarez, Enzo Marinari, Paul Windey, 2012-11-05 The Cargese Workshop Random Surfaces and Quantum Gravity was held from May 27 to June 2 1990 Little was known about string theory in the non perturbative regime before October 1989 when non perturbative equations for the string partition functions were found by using methods based on the random triangulations of surfaces This set of methods provides a description of non critical string theory or equivalently of the coupling of matter fields to quantum gravity in two dimensions The Cargese meeting was very successful in that it provided the first opportunity to gather most of the active workers in the field for a full week of lectures and extensive informal

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Random Surface Interpretations of Two-dimensional Liouville Quantum Gravity and Yang-Mills Theory Minjae Park (Scientist in mathematics), 2022 The theory of random surfaces or sums over surfaces has its historical roots in quantum gravity string theory statistical physics and combinatorics This thesis explores random surfaces in two settings one related to Liouville quantum gravity and one related to Euclidean Yang Mills theory in two dimensions The first part introduces a specific regularization of Liouville quantum gravity surfaces It also establishes the Polyakov Alvarez formula on non smooth surfaces with Brownian loops instead of the zeta regularized Laplacian determinant Consequently weighting by a Brownian loop soup changes the so called central charge of the regularized random surfaces as expected in physics literature This result justifies a definition of Liouville quantum gravity surfaces in the supercritical regime where the central charge is greater than 1 The second part describes continuum Wilson loop expectations on the plane as sums over surfaces an example of gauge string duality In contrast to the Gross Taylor expansion our weight is explicit as N^{χ} where χ is the Euler characteristic for any gauge group $U(N)$, $SO(N)$, $Sp(N)$ Based on the well established continuum theory in two dimensions we provide a probabilistic treatment for Wilson loop expectations also leading to various applications like an alternative proof for the Makeenko Migdal equation and a connection with a random walk on permutations

Two Dimensional Quantum Gravity and Random Surfaces David J. Gross, 1992

Random Surfaces and 2D Quantum Gravity : Proceedings of the Workshop, 1991, Barcelona, Spain J....[et al] Ambjørn, 1992

Random Surfaces Martin Guy Harris, 1994

Random Surfaces and 2D Quantum Gravity Jan Ambjørn, 1992

Regularized Quantum Gravity and String Theory J. (Kbh. Univ. Niels Bohr Institutet) Ambjørn, 1991

Random Walks, Critical Phenomena, and Triviality in Quantum Field Theory Roberto Fernandez, Jürg Fröhlich, Alan D. Sokal, 2013-03-14 Simple random walks or equivalently sums of independent random variables have long been a standard topic of probability theory and mathematical physics In the 1950s non Markovian random walk models such as the self avoiding walk were introduced into theoretical polymer physics and gradually came to serve as a paradigm for the general theory of critical phenomena In the past decade random walk expansions have evolved into an important tool for the rigorous analysis of critical phenomena in classical spin systems and of the continuum limit in quantum field theory Among the results obtained by random walk

methods are the proof of triviality of the cp_4 quantum field theory in space time dimension $d = 4$ and the proof of mean field critical behavior for cp_4 and Ising models in space dimension $d = 4$ The principal goal of the present monograph is to present a detailed review of these developments It is supplemented by a brief excursion to the theory of random surfaces and various applications thereof This book has grown out of research carried out by the authors mainly from 1982 until the middle of 1985 Our original intention was to write a research paper However the writing of such a paper turned out to be a very slow process partly because of our geographical separation partly because each of us was involved in other projects that may have appeared more urgent

Quantum Geometry Jan Ambjørn, Bergfinnur Durhuus, Þórður Jónsson, 1997-06-19 Describes random geometry and applications to strings quantum gravity topological field theory and membrane physics

Conformal Field Theory Serge Vladimirovich Ketov, 1995 Conformal field theory is an elegant and powerful theory in the field of high energy physics and statistics In fact it can be said to be one of the greatest achievements in the development of this field Presented in two dimensions this book is designed for students who already have a basic knowledge of quantum mechanics field theory and general relativity The main idea used throughout the book is that conformal symmetry causes both classical and quantum integrability Instead of concentrating on the numerous applications of the theory the author puts forward a discussion of the general methods of conformal field theory as a physical theory Hence the book provides in a self contained way the necessary knowledge and conformal intuition which underline the various applications of conformal field theory It is aimed to assist students and professionals in the study of the theory from its first principles and in applying the methods in their own research The first of its kind this book promises to give a detailed and comprehensive insight into the workings of conformal field theory

Statistical Mechanics And Field Theory - Proceedings Of The Seventh Physics Summer School Vladimir V Bazhanov, Conrad J Burden, 1995-12-21 This proceedings volume aims to expose graduate students to the basic ideas of field theory and statistical mechanics and to give them an understanding and appreciation of current topical research

A New Approach to Three-dimensional Quantum Gravity ... J. (Kbh. Univ. Niels Bohr Institutet)

Ambjørn, Varsted S. (Kbh. Univ. Niels Bohr Institutet), 1991

Lattice 91 M. Fukugita, Y. Iwasaki, M. Okawa, 2016-06-03 Lattice 91 covers the proceedings of the International Symposium on Lattice Field Theory held in Tsukuba Japan on 5-9 November 1991 The book focuses on quantum chromodynamics Higgs fermion theories QED lattice quantum gravity and random surfaces spin systems related to field theory simulation algorithms and dedicated computers The selection first offers information on the QCD spectrum and phase diagram on the lattice and QCD at finite density including phase structure of QCD Monte Carlo simulations with dynamical fermions and quenched approximation The book then tackles weak matrix elements simulation of heavy quarks and sphaleron induced baryon number non conservation The text reviews quantum gravity and random surfaces recent analytic progress in finite size effects and parallel QCD machines Discussions focus on two dimensional quantum gravity signatures of resonance in finite volume first order transitions and determination of the

running coupling The publication also ponders on hadronic forces from the lattice universality of the confinement string in multiple potentials and confinement and saddle point configurations The selection is highly recommended for readers interested in the lattice field theory

Springer Handbook of Spacetime Abhay Ashtekar, Vesselin Petkov, 2014-09-01 The Springer Handbook of Spacetime is dedicated to the ground breaking paradigm shifts embodied in the two relativity theories and describes in detail the profound reshaping of physical sciences they ushered in It includes in a single volume chapters on foundations on the underlying mathematics on physical and astrophysical implications experimental evidence and cosmological predictions as well as chapters on efforts to unify general relativity and quantum physics The Handbook can be used as a desk reference by researchers in a wide variety of fields not only by specialists in relativity but also by researchers in related areas that either grew out of or are deeply influenced by the two relativity theories cosmology astronomy and astrophysics high energy physics quantum field theory mathematics and philosophy of science It should also serve as a valuable resource for graduate students and young researchers entering these areas and for instructors who teach courses on these subjects The Handbook is divided into six parts Part A Introduction to Spacetime Structure Part B Foundational Issues Part C Spacetime Structure and Mathematics Part D Confronting Relativity theories with observations Part E General relativity and the universe Part F Spacetime beyond Einstein

Random Surfaces and 2D Quantum Gravity J Ambjorn, 1992

M-Theory and Quantum Geometry Lárus Thorlacius, Thordur Jonsson, 2012-12-06 The fundamental structure of matter and spacetime at the shortest length scales remains an exciting frontier of basic research in theoretical physics A unifying theme in this area is the quantization of geometrical objects The majority of lectures at the Advanced Study Institute on Quantum Geometry in Akureyri was on recent advances in superstring theory which is the leading candidate for a unified description of all known elementary particles and interactions The geometric concept of one dimensional extended objects or strings has always been at the core of superstring theory but in recent years the focus has shifted to include also higher dimensional objects so called D branes which play a key role in the non perturbative dynamics of the theory A related development has seen the strong coupling regime of a given string theory identified with the weak coupling regime of what was previously believed to be a different theory and a web of such dualities that interrelates all known superstring theories has emerged The resulting unified theoretical framework termed M theory has evolved at a rapid pace in recent years

Whispering the Secrets of Language: An Mental Journey through **Random Surfaces And Quantum Gravity**

In a digitally-driven world where displays reign supreme and quick communication drowns out the subtleties of language, the profound techniques and emotional nuances concealed within words often get unheard. However, situated within the pages of **Random Surfaces And Quantum Gravity** a captivating literary prize sporting with raw thoughts, lies an exceptional quest waiting to be undertaken. Composed by an experienced wordsmith, that wonderful opus encourages readers on an introspective journey, delicately unraveling the veiled truths and profound impact resonating within the cloth of every word. Within the psychological depths of the emotional evaluation, we will embark upon a sincere exploration of the book is key styles, dissect its fascinating publishing model, and fail to the effective resonance it evokes deep within the recesses of readers hearts.

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