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| Collana | Les Houches |
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| Nota di contenuto | Front cover; Lecturers who contributed to this volume; Title page; Copyright page; Previous sessions; Organizers; Lecturers; Participants; Preface; Informal seminars; Table of contents; Course 1 Random matrices and determinantal processes; Introduction; Point processes; General theory; Determinantal processes; Measures defined by products of several determinants; Non-intersecting paths and the Aztec diamond; Non-intersecting paths and the LGV theorem; The Aztec diamond; Relations to other models; Asymptotics; Double contour integral formula for the correlation kernel Asymptotics for the Aztec diamondAsymptotics for random permutations; The corner growth model; Mapping to non-intersecting paths; The Schur and Plancherel measures; A discrete polynuclear growth model; Proof of theorem 5.1; References; Course 2 Some recent aspects of random conformally invariant systems; Some discrete models; Self-avoiding walks and polygons; Random walk loops; Site-percolation; The Ising model; The Potts models; FK representations of Potts models; The $O(N)$ models; Conformal invariance; A "conformal Haar measure" on self-avoiding loops; Preliminaries A conformal invariance propertyUniqueness; Existence; Schramm-Loewner Evolutions; Definition; Computing with SLE; Conformal loop- |

ensembles; Definition; First properties; The loop-soup construction; The Gaussian free field; Definition; "Cliffs" as level lines; References; Course 3 Conformal random geometry; Preamble; Introduction; A brief conformal history; Conformal geometrical structures; Quantum gravity; Stochastic Loewner evolution; Recent developments; Synopsis; Intersections of random walks; Non-intersection probabilities; Quantum gravity; Random walks on a random lattice
Non-intersections of packets of walks Mixing random & self-avoiding walks; General star configurations; Quantum gravity for SAW's & RW's; RW-SAW exponents; Brownian hiding exponents; Percolation clusters; Cluster hull and external perimeter; Harmonic measure of percolation frontiers; Harmonic and path crossing exponents; Quantum gravity for percolation; Multifractality of percolation clusters; Conformally invariant frontiers and quantum gravity; Harmonic measure and potential near a fractal frontier; Calculation of multifractal exponents from quantum gravity
Geometrical analysis of multifractal spectra Higher multifractal spectra; Double-sided spectra; Higher multifractality of multiple path vertices; Winding of conformally invariant curves; Harmonic measure and rotations; Exact mixed multifractal spectra; Conformal invariance and quantum gravity; Rotation scaling exponents; Legendre transform; $O(N)$ & Potts models and the Stochastic Loewner Evolution; Geometric duality in $O(N)$ and Potts cluster frontiers; Geometric duality of SLE κ ; Quantum gravity duality and SLE; Dual dimensions; KPZ for SLE; Short distance expansion
Multiple paths in $O(N)$, Potts models and SLE

Sommario/riassunto

The proceedings of the 2005 les Houches summer school on Mathematical Statistical Physics give a broad and clear overview on this fast developing area of interest to both physicists and mathematicians. · introduction to a field of math with many interdisciplinary connections in physics, biology, and computer science · roadmap to the next decade of mathematical statistical mechanics · volume for reference years to come
