

Contents

Introduction to M Theory and AdS/CFT Duality John H. Schwarz	1
Interconnections Between Type II Superstrings, M Theory and $\mathcal{N} = 4$ Yang–Mills Michael B. Green	22
Supermembranes and Super Matrix Models Bernard de Wit	97
Black Holes, Branes and Superconformal Symmetry Renata Kallosh	138
Old and New Approaches to Non–Perturbative Gauge Dynamics Eliezer Rabinovici	169
Strings, Matrices and Black Holes Robbert Dijkgraaf	200
Orbifolds of AdS_3 and Fixpoints of the CFT Klaus Behrndt	264
Holography and the Weyl Anomaly Måns Henningson and Kostas Skenderis	271
The QCD String and Generalized Wave Equation George K. Savvidy	279
On Supergravity Duals of $\mathcal{N} = 1$ SCFT in Four Dimensions Alexandros Kehagias	293
On (Multi–)Center Branes and Exact String Vacua Konstadinos Sfetsos	303

2D Yang–Mills Theory as a Matrix String Theory Marco Billò, Michele Caselle, Alessandro D’Adda, and Paolo Provero	313
Interacting Strings in Matrix String Theory Giulio Bonelli	323
Graviton Scattering in Matrix Theory and Supergravity Marco Fabbrichesi	333
The $Osp(8 4)$ Singleton Action from the Super Membrane Gianguido Dall’Agata, Davide Fabbri, Christophe Fraser, Pietro Fré, Piet Termonia, and Mario Trigiante	339
Non–Perturbative Corrections in $\mathcal{N} = 2$ Strings Andrea Gregori	348
Brane Actions and String Dualities Eduardo Eyras and Yolanda Lozano	356
On Heterotic/Type I Duality in $d = 8$ Kristin Förger	365
Near Horizon Supergravity Superspace Piet Claus	375
On Higher Order α' Corrections to Black Brane Geometries Jacek Pawełczyk and Stefan Theisen	382
D3–Brane Dynamics and Black Holes Matteo Bertolini, Pietro Frè, Roberto Iengo, and Claudio A. Scrucca	388
The M Five Brane on a Torus David Berman	398
Branes and the WDVV Equation Jose M. Isidro	406
Action for IIB Supergravity in 10 Dimensions Gianguido Dall’Agata, Kurt Lechner, and Mario Tonin	416
U–Duality and M–Theory, an Algebraic Approach Niels A. Obers and Boris Pioline	424
Supersymmetric 3–Cycles for $\mathcal{N} = 1$ Brane Box Models Andreas Karch, Dieter Lüst, and André Miemiec	434

Duality in String Cosmology Ram Brustein	446
Spin Dependent D–Brane Interactions and Scattering Amplitudes in Matrix Theory Jose F. Morales, Jan C. Plefka, Claudio A. Scrucca, Marco Serone, and Andrew K. Waldron	456
Prescriptions for Off–Shell Bosonic String Amplitudes Luigi Cappiello, Antonella Liccardo, Raffaele Marotta, Roberto Pettorino, and Franco Pezzella	466
On Wilson Loops and $Q\bar{Q}$–Potentials from the AdS/CFT Relation at $T \geq 0$ Harald Dorn and Hans–Jörg Otto	475
Topological Strings, Contact Terms and the Holomorphic Anomaly Carlo Becchi, Stefano Giusto, and Camillo Imbimbo	483
Equivalence of Geometric Engineering and Hanany–Witten Douglas J. Smith	493
Ramond–Ramond (Boundary) States Marco Billó and Roberto Russo	499
An Effective Supergravity for the Thermal Phases of $\mathcal{N} = 4$ Strings Jean-Pierre Derendinger	509
Universal $\mathcal{N} = 4$ Non-Perturbative Thermal Instabilities; the High-T String Phases Costas Kounnas	519
Corrections to Macroscopic Supersymmetric Black–Hole Entropy Gabriel Lopes Cardoso	533