1. Record Nr. UNINA9910254601103321

Autore	Vescovi Edoardo
Titolo	Perturbative and Non-perturbative Approaches to String Sigma-Models in AdS/CFT / / by Edoardo Vescovi
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-63420-8
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (246 pages) : illustrations, tables
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	530.120151255
Soggetti	Quantum field theory String models Particles (Nuclear physics) Superconductivity Superconductors Quantum Field Theories, String Theory Elementary Particles, Quantum Field Theory Strongly Correlated Systems, Superconductivity
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Superstring Actions in AdS5 × S5 and AdS4 × CP3 Spaces -- Geometric Properties of Semiclassically Quantized Strings -- “Exact” Semiclassical Quantization of Folded Spinning Strings -- Towards Precision Holography for Latitude Wilson Loops -- Light-like Cusp Anomaly and the Interpolating Function in ABJM -- AdS5 × S5 Superstring on the Lattice -- Conclusion and outlook.
Sommario/riassunto	This thesis introduces readers to the type II superstring theories in the AdS5×S5 and AdS4×CP3 backgrounds. Each chapter exemplifies a different computational approach to measuring observables (conformal dimensions of single-trace operators and expectation values of Wilson loop operators) relevant for two supersymmetric theories: the N=4 super Yang-Mills theory and the N=6 Chern-Simons-matter (ABJM) theory. Perturbative techniques have traditionally been used to make quantitative predictions in quantum field theories, but they are only

reliable as long as the interaction strengths are weak. The anti-de Sitter/conformal field theory (AdS/CFT) correspondence realizes physicists' dream of studying strongly coupled quantum field theories with "enhanced" symmetries, using the methods provided by string theory. The first part of the thesis sets up the semiclassical quantization of worldsheet sigma-model actions around string solutions of least area in AdS space. This machinery is used to capture quantum corrections at large coupling to next-to-leading and next-to-next-to-leading order by solving the determinants of partial differential operators and by computing Feynman diagrams, respectively. In turn, the second part presents an innovative approach based on Monte Carlo simulations to finite coupling for a lattice-discretized model of the AdS5×S5 superstring action. The thesis focuses on fundamental aspects, as well as on applications previously published by the author, and offers a valuable reference work for anyone interested in the most recent developments in this field.