

String Theory and Holographic Duality

Hong Liu

1. [Emergence of Gravity](#)
2. [Classical Black Hole Geometry](#)
3. [Causal Structure of a Black Hole and Black Hole Temperature](#)
4. [Physical Interpretation of Black Hole Temperature](#)
5. [Black Hole Thermodynamics](#)
6. [Holographic Principle](#)
7. [Structure of Large N Expansion](#)
8. [Large N Expansion as a String Theory Part I](#)
9. [Large N Expansion as a String Theory Part II](#)
10. [Basics of String Theory and Light-Cone Gauge](#)
11. [String Theory in the Light-Cone Gauge](#)
12. [String Spectrum and Graviton](#)
13. [Physics of D-branes Part I](#)
14. [Physics of D-branes Part II](#)
15. [Physics of D-branes Part III](#)
16. [Geometry of D-Branes and AdS/CFT Conjecture](#)
17. [More on AdS/CFT Duality](#)
18. [General Aspects of the Duality](#)
19. [Mass-Dimension Relation](#)
20. [Euclidean Correlation Functions: Two-Point Functions](#)
21. [Euclidean Correlation Functions: Higher-Point Functions](#)
22. [Computation of the Wilson Loop](#)
23. [Duality at a Finite Temperature and Finite Chemical Potential](#)

24. Holographic Entanglement Entropy

April 18, 2025