

Series 6

We have basically reached the end of part 1 of the lectures (CFT in $d \geq 2$), and this week's material does not lend itself to practical calculations. Therefore this Series contains a number of conceptual questions about everything we've done so far. Please e-mail me the typed answers by March 30 (one paragraph per answer maximum), this will allow me to address possible gaps in your understanding. (These are also the sort of questions I might ask in an oral exam...)

I. CFT in $d \geq 2$

1. Give a motivation for the study of CFT.
2. How are conformal transformations characterized?
3. What are the constraints of conformality in 1d?
4. Describe the different generators of the conformal group. How do they act on the coordinates?
5. What are the properties of the energy-momentum tensor of a conformally invariant theory?
6. Under which conditions does scale invariance imply conformal invariance?
7. What do we mean by a classical invariance/symmetry?
8. What do we mean by a symmetry at the quantum level?
9. List some advantages a conformally invariant QFT has compared to one with just Lorentz invariance.
10. What is the interpretation of a Ward identity?
11. What is the conceptual basis of the null-cone formalism?
12. What are the practical advantages of the null-cone formalism?
13. What is the role of the dilatation generator in radial quantization?
14. What is the state-operator correspondence?
15. What can we use the state-operator correspondence for?