

Black Holes and Quantum Info, Fall 2021

Problem Set 2

Due: in lecture Thursday, Sep. 23

Reading. Do the reading for each lecture posted on the website.

Problems

1. Consider a 2d QFT. Let A be the interval $x \in [u, v]$ at $t = 0$. Draw a picture of the path integral that computes the density matrix ρ_A in the vacuum state. (In the next problem you will find the formula corresponding to this drawing.)
2. Exercise “State on an interval in 2d CFT” in QGBH section 5.
3. Exercise “Thermodynamics of 3d black holes” in QGBH section 2.
4. Exercise “Black hole collision” in QGBH section 2.
5. Exercise “Perturbative 2nd law” in QGBH section 2.