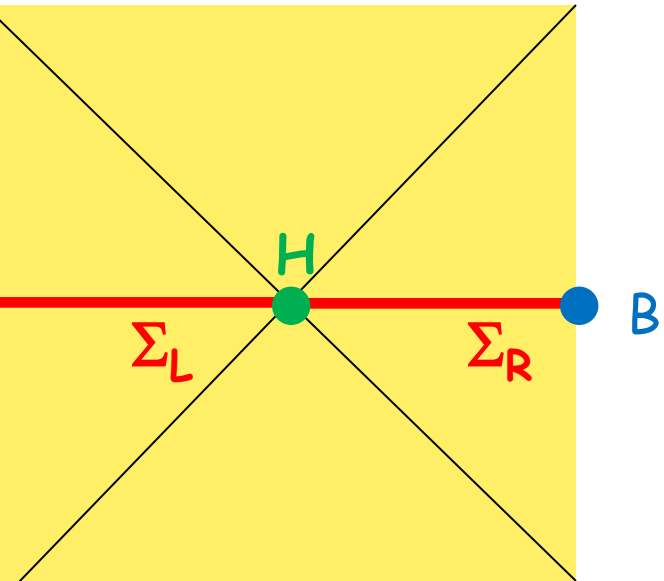
CFT entanglement and bulk connectivity: Comment on the TFD

$$|TFD> = \sum e^{-E/2T}|E>|E>$$

$$|O>_{Mink(AdS)} = \sum e^{-\frac{E}{2T}}|E>_{Rindler,R}|E>_{Rindler,L}$$

TFD has 1) trans-CFT entanglement &
2) trans-horizon entanglement in the bulk
But these are *not* the same entanglements! (Different E's!)



$$E_{Rindler,R} = \int_{\Sigma_R} \sqrt{h}\ Tab\ na\ Kb$$

$$E_{CFT,R} = EADM_{,R} = bndy\ term\ @\ B$$

To leading non-trivial order in ℓ_{Planck}

$$\Delta = E_{CFT} - ERind_{ler\ R} = bndy\ term\ @\ H$$

which generates kinks in Σ_R *relative to* Σ_L.

Comments:

- By symmetry, Δ lives equally in both CFTs.
- Acting on |TFD> with $\sum_i e^{-iHti}$ can produce $|E\rangle_L|E\rangle_R$ but does not obviously disentangle bulk or produce a "firewall." Merely produces a superposition of wormholes.
- Acting on |TFD> with $b, b^\dagger$ does not obviously disentangle the CFTs.
- Ryu-Takayangi certainly implies some *correlation* between bulk vacuum entanglement (measured by area) and CFT entanglement. But this does not imply physical equivalence.