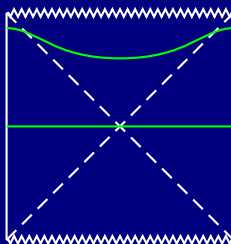


When the Hartman-Maldacena Paradigm Fails

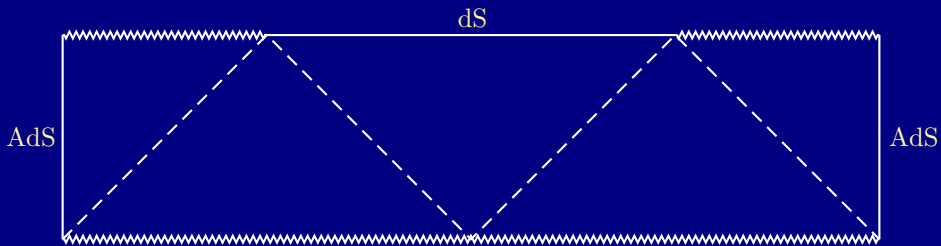
Sebastian Fischetti
(with Don Marolf)



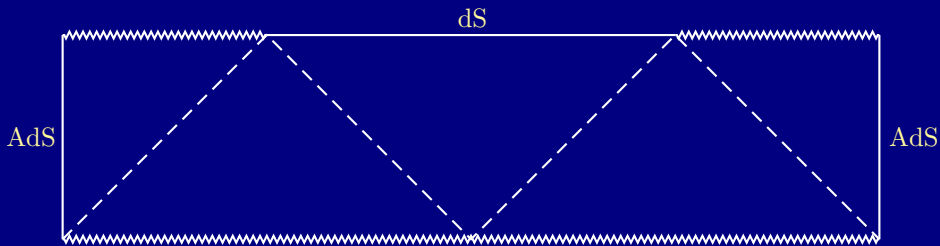
Quantum Information in Quantum Gravity
August 20, 2014



Consider This

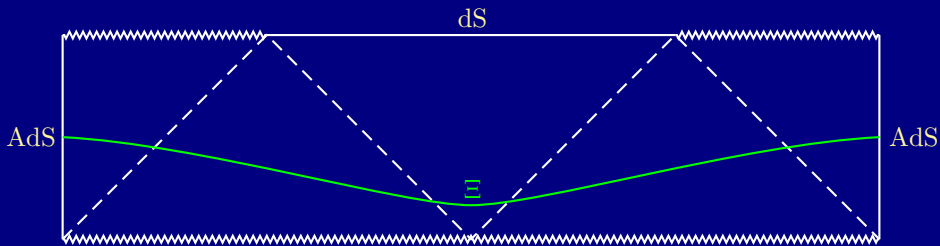


Consider This



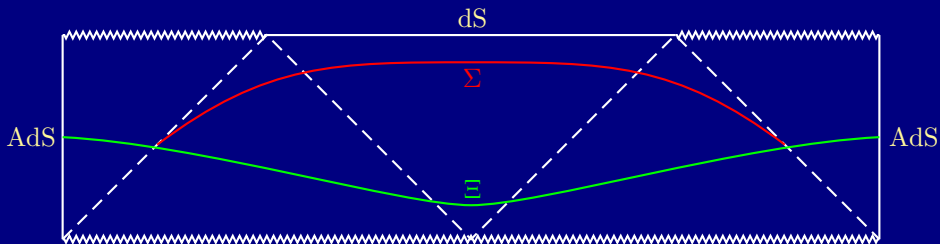
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.

Consider This



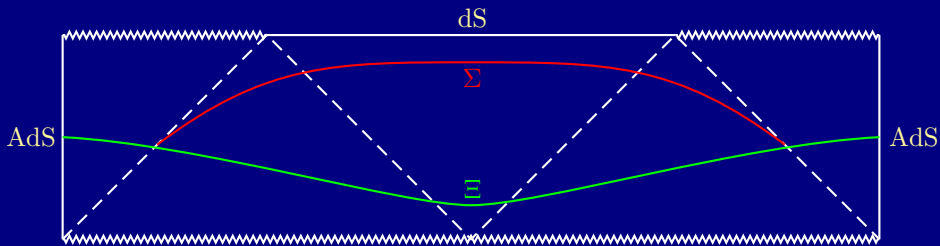
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.

Consider This



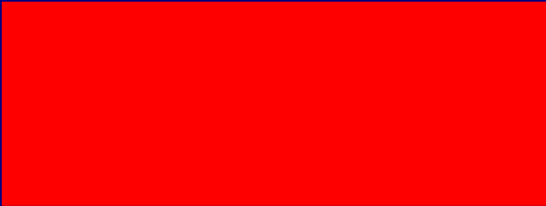
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.

Consider This



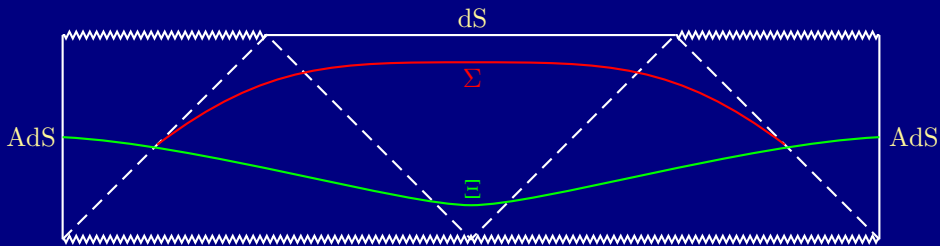
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.

x

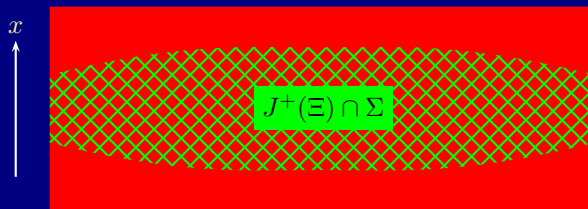


A large red rectangle is positioned to the right of the x label. A vertical arrow points upwards from the bottom of the rectangle towards the x label.

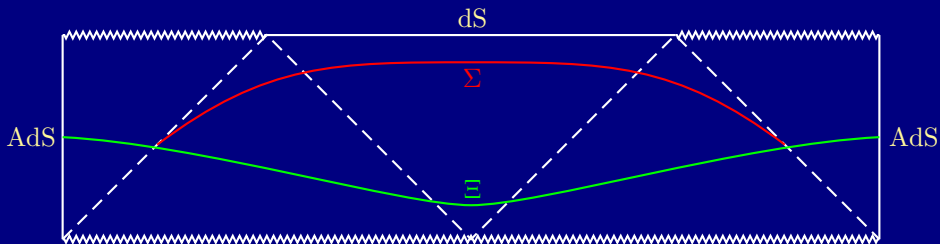
Consider This



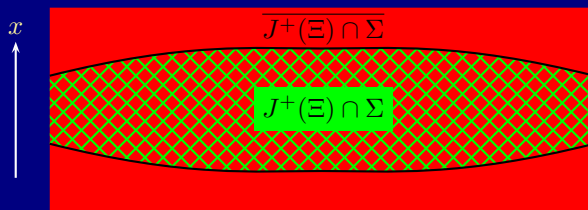
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.



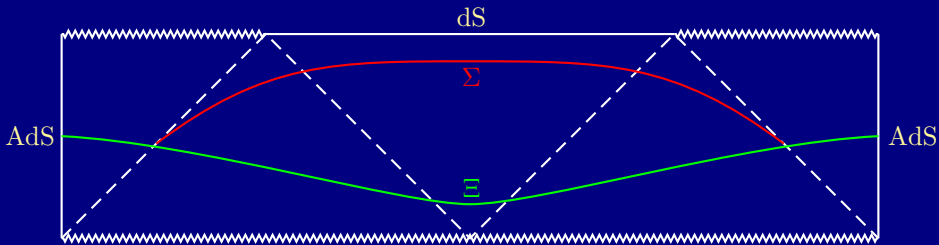
Consider This



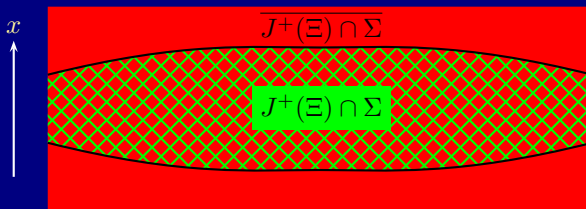
Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.



Consider This



Claim: this spacetime does not admit codimension-2 extremal surfaces connecting the AdS boundaries.



BUT: mutual information between the two CFTs is nonzero!

Last Remarks/Questions

- Here's a geometry where the (nonlocal) mutual information between the entire CFTs is nonzero, but the mutual information between localized regions (e.g. strips, half-planes) is zero according to HRT
- What is the CFT state?
- Is this behavior of the (localized) mutual information correct?
- Could complex surfaces need to be included in calculations of HEE? (e.g. SF & Marolf, arXiv:1407.2900)
 - Could come from saddle point approximation like e.g. correlators
 - If they are important, how do they contribute to S_{EE} ?