Modular Hamiltonian in (W)AdS/WCFT

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Abstract:

In studying holography beyond AdS/CFT, in particular flat holography [1] and (W)AdS/WCFT [2], it was found that the holographic entanglement entropy (HEE) is modified from RT to the area of some exotic curve of a "swing" shape: one extremal curve cut and connected to the boundary by two null geodesics. Inspired by the similarity of geometric picture they share, by studying the modular Hamiltonian, we proposed a generalized geometric picture for HEE [3], which generalize previous work [1-2] which only apply for zero modes and single intervals. In both flat holography and (W)AdS/WCFT, we calculated explicitly the modular Hamiltonian and HEE and verified the entanglement first law in the bulk.
In this talk, I will mainly focus on AdS/WCFT as an example. First, I will introduce how to use a generalized Rindler method to calculate the boundary modular generator and modular Hamiltonian associated with an interval region. Then use the AdS/WCFT dictionary, we can write the bulk modular generator. With this bulk generator and the RT-like surface in hand, we can calculate Wald's covariant charge. When evaluated on the asymptotic entanglement interval, it gives the bulk modular Hamiltonian; on the RT-like surface, it gives the holography entanglement entropy. They satisfy the entanglement first law. Then I will use this example to illustrate our generalized proposal for HEE.

References

[1] H. Jiang, W. Song, and Q. Wen, JHEP 07, 142 (2017), arXiv:1706.07552 [hep-th].
[2] W. Song, Q. Wen, and J. Xu, JHEP 02, 067 (2017), arXiv:1610.00727 [hep-th].
[3] L. Apolo, H. Jiang, W. Song and Y. Zhong, to be appear.